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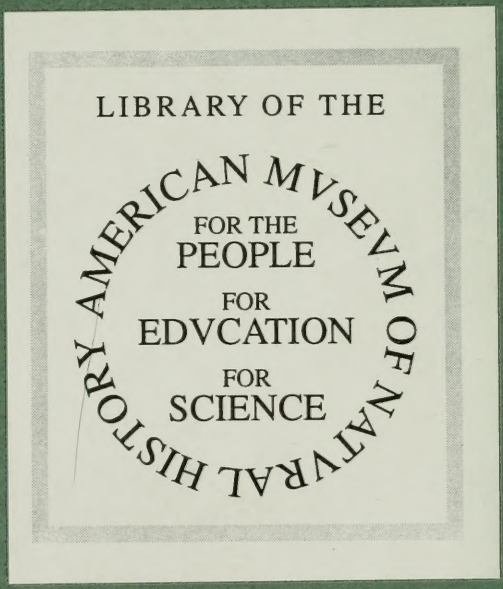
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LIST OF BIRDS ASCERTAINED TO INHABIT THE DISTRICT OF COLUMBIA, WITH THE TIMES OF ARRIVAL AND DEPARTURE OF SUCH AS ARE NON-RESIDENTS, AND BRIEF NOTICES OF HABITS, ETC.

BY ELLIOTT COUES AND D. WEBSTER PRENTISS.

FROM the central situation of the District of Columbia, with regard to the northern and southern sections of the country, together with the varied character of surface which it presents, it might be expected to possess a rich and interesting *avi-fauna*. Such has been found to be the case. It seems to be on the natural dividing line between the true northern and southern faunas, it being impossible to decide which takes precedence. Therefore, if we except a few peculiarly favored regions, we are enabled to present a more extensive list of species inhabiting the district than has been given for almost any other locality in eastern North America.

Though the number of birds which are resident throughout the year and those which breed here is considerable, they are few in comparison with those which pass through during their spring and autumn migrations, and remain for a longer or shorter time each season. The number of species, indeed, is not greater, but the individuals of each are very numerous. It is on this account that for a month or so during the spring and autumn—from about the 20th of April to the 20th of May, and from the 1st of September to the middle of October—the collector is so amply repaid for his pains, while at other times ornithologizing, except for some particular birds, is hardly worth the time and trouble. So numerous, indeed, are individuals of most of the migratory species that at the height of the season in spring we have collected, in a walk before breakfast, from forty to fifty specimens of various species of warblers, thrushes, flycatchers, finches, &c. As an instance of the number of birds which pass through the District on their way north to breed, compared with those which remain with us during the summer, may be cited the wood-warblers, or *Dendroicæ*. Of the twelve or thirteen wood-warblers found more or less abundantly in the spring and fall, only three are known to breed here. The same might be affirmed of other birds, as the thrushes, flycatchers, sandpipers, &c.

Though there is included in the list only those species which have been positively detected, there are some of which specimens have been obtained, and yet are not entitled to be considered as inhabitants of the District. These may be divided into three classes: First, those which visit us in severe winters, being driven south, out of

their usual range, by scarcity of food or other causes ; such are the *Nyctea nivea*, *Astur atricapillus*, *Collyrio borealis*, *Pinicola canadensis*, and others. Second, those which visit us in July and August, which are mostly the young of species breeding further south. Examples of these are to be seen in the *Rhynchops nigra*, some species of *Ardeidæ*, &c. In the third class are to be ranged those whose appearance is totally accidental, dependent upon no fixed habit of the bird. Thus, species of *Thallassidroma* and *Puffinus* have been seen upon the Potomac, and a *Milvulus* (M. *forficatus*, probably) and the *Chamæpelia passerina* have been detected.

The great mass of the birds which pass through the district in their spring migrations do not stop to breed before reaching, at least, the New England States, and probably the majority go still further north, spreading through the Canadas and into British America to the region around Hudson's bay. Our regular winter visitants, as the *Junco hyemalis*, *Spizella monticola*, and the *Anatidæ* generally, do not usually stop much short of Labrador and the regions of that latitude. Other species, however, breed with equal readiness in almost any latitude. Thus the *Dendroica aestiva* is very common through the summer in the district, and doubtless even further south; while it breeds also in very high latitudes in British America. During the winter these migratory species mostly retire to the Antilles, or into Central America, though many linger in the Gulf States along our southern border. The manner in which these extensive migrations are performed varies, doubtless, with different groups of birds, but it is very difficult to conceive how some weak and short-winged species can perform the immense journey. Some accomplish the distance by continually flying from forest to forest, and from hedge to hedge; while others mount directly high into the air, and uninterruptedly continue their flight until hunger or weariness compels them to desist for awhile. This kind of migration is performed by some species wholly in the night time. Some of the small insectivorous birds have been noticed just at daybreak to descend from a great height, and after remaining motionless for sometime, as if to recuperate their energies, search diligently for food, and again resume their flight towards evening. The distance at which the notes of birds flying overhead can be heard is truly surprising. We have heard distinctly the mellow notes of the *Bob-o'link* while the bird itself was entirely beyond our range of vision. The loud "honking" of wild geese while migrating is well known.

A circumstance which has considerable influence on the appearance of birds in the immediate vicinity is the presence of a large city. This is most strikingly shown in the case of the ducks and other water fowl, to which the attention of the sportsman is especially directed. The peculiar character of Chesapeake bay and its tributaries render them the favorite winter resort of nearly all the species of *Anatidæ ;* but the incessant persecutions to which these birds are subjected have effected a material diminution of their numbers, and caused a great part of them to retire to the bogs and inlets of more southern shores. The same is true, though less markedly, of various

shy and solitary birds, (as, for example, the *Hylatomus pileatus*,) which are gradually retiring with the clearing up of the forests to more mountainous and inaccessible regions. Nevertheless, the pertinacity with which some birds hold their ground is surprising. Thus the common partridge, though so continually persecuted by sportsmen, is still very numerous, even in the immediate vicinity of the city. A total change of habit by civilization, sometimes to be observed, is extremely interesting. There can be no doubt that before the settlement of the country the *Chaetura pelasgia* bred in hollow trees. This habit is now totally lost, the bird finding chimneys better suited to its wants. In like manner, the *Hirundo horreorum* now breeds altogether on the rafters and beams of barns and outhouses, while the *H. lunifrons* is gradually abandoning the sides of cliffs for the convenient situations afforded by the projecting eaves of buildings. The *Progne purpurea* always gives preference to the boxes now everywhere placed for its accommodation.

With these brief and very cursory remarks, which might be greatly extended did space permit, we proceed to the list of the species ascertained to inhabit the District. Our observations, from which the paper has been prepared, have extended over a period of nearly five years, during which all the time that could be spared from other occupations has been devoted to the study of birds. No species has been admitted which has not been actually detected in the District or its immediate vicinity. A few of whose existence there can be little or no doubt, are included in brackets, but still are not counted in the list. The date given for the arrival and departure of any bird is the mean of those observed during each successive year, since the appearance and disappearance of birds depend somewhat on the early or late advance of the season. It is regretted that the account of some of the water birds is so scanty and incomplete; but it is hoped that the very full details of most of the land birds will in a measure atone for the deficiency in this respect.

1. *Cathartes aura*, (Linn.,) Ill.—Turkey Buzzard. Permanent resident. Abundant. Not ordinarily gregarious, but collects in great numbers where offal of any description is exposed.

2. *Falco columbarius*, Linn. Pigeon Hawk. Rather rare, but few having been observed. Very shy. Sometimes exposed for sale in the market.

3. *Falco* (*Tinnunculus*) *sparverius*, Linn. Sparrow Hawk. Resident. Abundant. Generally found in open fields, about hedges, stumps, dead trees, &c.

4. *Astur atricapillus*, (Wils.,) Bon.—Goshawk. Very rare; only occasionally observed during the winter months.

5. *Accipiter cooperi*, Bon.—Cooper's Hawk. Resident. One of the most common hawks. Frequents chiefly open fields, searching for mice, small birds, &c.

6. *Accipiter fuscus*, (Gm.,) Bon.—Sharp-shinned Hawk. Resident. Very abundant, and the least shy of the hawks. Frequents hedges, ditches, brier patches, &c.

7. *Buteo borealis*, (Gm.,) Vieill.—Red-tailed Hawk. "Hen Hawk." Resident. Abundant, especially in winter. Very shy and wary. Generally seen upon the largest trees in open fields.

8. *Buteo lineatus*, (Gm.,) Jard.—Red-shouldered Hawk. "Chicken Hawk." Resident. Common. Habits much like those of the preceding, with which it is generally confounded by farmers.

9. *Buteo pennsylvanicus*, (Wils.,) Bon.—Broad-winged Hawk. Very rare; only occasionally observed. Specimens have been obtained in the market.

[*Nauclerus furcatus*, Vig.—Swallow-tailed Kite. As this bird goes considerably further north, it doubtless is to be found in the District, though we have never detected it.]

10. *Circus hudsonicus*, (Linn.,) Vieill.—Marsh Hawk. Resident. Very abundant. Generally seen over the marshes of the rivers, and the wet meadows north of the city.

11. *Aquila canadensis*, (Linn.,) Cass.—Golden Eagle. Apparently not rare; individuals being observed or taken almost every winter. Two specimens from this locality are now in the museum of the Smithsonian Institution.

12. *Haliætus leucocephalus*, (Linn.,) Savig.—Bald-headed Eagle. Not rare. Frequently seen sailing along over the river and perched upon stumps and snags upon the "flats." Resident.

13. *Pandion carolinensis*, (Gm.,) Jard.—Fish Hawk. Osprey. Common. Seen over the Potomac and Anacostia rivers, and upon the branches of dead trees overhanging their banks.

14. *Scops asio*, (Linn.,) Bon.—Screech Owl. The most abundant as well as the smallest of the owls. This as well as the other owls are comparatively seldom seen on account of their nocturnal habits.

15. *Bubo virginianus*, (Gm.,) Bon.—Great Horned Owl. "Cat Owl." Not common. Sometimes offered for sale in the market. Seldom seen, but its note often heard in woods, "making night hideous."

16. *Otus wilsonianus*, Lesson.—Long-eared Owl. More abundant than the preceding. Seldom seen. Passes the day in hollow trees, thick clumps of pines, &c.

17. *Brachyotus cassinii*, Brew.—Short-eared Owl. Very abundant. Less shy than preceding, and apparently more confused by the light of day. Has been caught in the streets of the city.

18. *Syrnium nebulosum*, (Forst.,) Gray.—Barred Owl. Rare. But a few specimens observed. Found chiefly in day time in close cedar thickets, near farm houses.

19. *Nyctea nivea*, (Daud.,) Gray.—Snowy Owl. Very rare; only occasionally observed during the severest weather in winter.

[*Nyctale acadica* may very probably be hereafter detected.]

20. *Coccygus americanus*, (Linn.,) Bon.—Yellow-billed Cuckoo. "Rain Crow." Very abundant, especially in spring and fall. Found chiefly in open woods. Breed plentifully. Fresh eggs are often found in a nest with young birds. Arrives May 1; departs late in September.

21. *Coccygus erythrophthalmus*, (Wils.,) Bon.—Black-billed Cuckoo. "Rain Crow." Less abundant than the preceding, but not at all

rare. Habits similar to those of the Yellow-billed Cuckoo. Note not so harsh and prolonged. Summer resident. Arrives May 1; departs late in September.

22. *Picus* (*Trichopicus*) *villosus*, Linn.—Hairy Woodpecker. Permanent resident. Apparently rare. General habits in common with the woodpeckers. Not at all shy.

23. *Picus* (*Trichopicus*) *pubescens*, Linn.—Downy Woodpecker. "Sapsucker." Resident all the year. Abundant. Breeds plentifully. Frequents chiefly orchards, the dead undergrowth of boggy marshes, and the more open cleared woods.

24. *Sphyropicus varius*, (Linn.,) Baird.—Yellow-bellied Woodpecker. Resident all the year. Abundant, particularly in the fall. Frequents chiefly high open woods, but often seen in thickets and tangled copses. Very fond of the berries of the sour gum.

25. *Hylatomus pileatus*, (Linn.,) Bd.—Pileated Woodpecker. "Cock of the Woods." "Black Log-Cock." Probably permanent resident. Rare, having retired from the immediate vicinity with the clearing off of the forests. Excessively shy and wary when seen.

26. *Centurus carolinus*, (Linn.,) Bon.—Red-bellied Woodpecker. Resident all the year; rather rare, and apparently more so than formerly.

27. *Melanerpes erythrocephalus*, (Linn.,) Sw.—Red-headed Woodpecker. "Red-head." Summer resident; high open woods and orchards. The most abundant of the woodpeckers. Arrives in spring usually the last week in April; leaves about the middle of September.

28. *Colaptes auratus*, (Linn.,) Sw.—Yellow-shafted Woodpecker. "Flicker." Resident all the year. Very abundant, particularly in spring and fall, when usually seen in straggling flocks. Breeds plentifully.

29. *Trochilus colubris*, Linn.—Ruby-throated Humming Bird. Summer resident. The only Humming Bird found here. Abundant, especially in the fall. Frequent exclusively the gardens in the city, patches of wild flowers, (golden rod, &c.,) along the sides of branches. Breed plentifully in the high woods. Arrive in spring about May 1, and remain till the first approach of cool weather.

30. *Chætura pelasgia*, (Linn.,) Steph.—Chimney Swift. Very abundant. Mostly seen in the city. Arrives second week in April; leaves towards the end of September.

31. *Antrostomus vociferus*, (Wils.,) Bon.—Whip-poor-will. Rare. Summer resident. Arrives first week in May; leaves third week in September. When suddenly startled flies off in a confused zigzag manner, unless during the breeding season.

32. *Chordeiles popetue*, (Vieill.,) Bd.—Night Hawk. "Bull Bat." Spring and autumn visitant. A few breed. Arrives May 1; leaves about October 6. Very abundant in the fall, especially just before its departure.

33. *Ceryle alcyon*, (Linn.,) Boie.—Kingfisher. Summer resident. Quite common along the banks of the rivers and Rock creek. Rather shy. Arrives the third week in March; leaves early in October.

34. *Milvulus* ——— ?—A Milvulus was seen, but, unfortunately,

not obtained, May 6, 1861, by Mr. C. Drexler. It was probably *M. forficatus.*

35. *Tyrannus carolinensis*, (Linn.,) Bd.—King Bird. "Bee Martin." Summer resident; breeds plentifully, but the greater number go further north. Arrives second week in April; leaves late in September.

36. *Myiarchus crinitus*, (Linn.,) Cab.—Great-crested Flycatcher. Common summer resident, but most numerous in spring and autumn. Arrives third week in April; leaves third week in September.

37. *Sayornis fuscus*, (Gm.,) Bd.—Pewee. "Tom-tit." Common summer resident, but more plentiful in spring and fall, since the greater number go further north to breed. Arrives the *first* of the spring visitants, about the first of March, and is very abundant for a month or more; in autumn becomes numerous about September 25, and does not leave till near the middle of October. Breeds in caves, about rocks, creeks, bridges, &c.

38. *Contopus virens*, (Linn.,) Cab.—Wood Pewee. Excessively abundant summer resident. Arrives last week in April; becomes very abundant in two weeks; leaves third week in September.

39. *Empidonax traillii*, (Aud.,) Bd.—Traill's Flycatcher. Rare; spring and fall visitant; perhaps a few breed. Times of arrival and departure much those of the succeeding.

40. *Empidonax minimus*, Baird.—Least Flycatcher. Spring and autumn visitant; none breed; rather common, most so in the spring. Frequents *exclusively* the margins of small streams and brooks, briar patches, &c. Arrives last week in April, remains about two weeks; arrives in autumn, third week in August, and remains till third week in September.

41. *Empidonax acadicus*, Gm., Bd.—Acadian Flycatcher. Common summer resident; the most abundant of the *Empidonaces*, and the only one that breeds here in any numbers. Arrives last week in April; leaves about September 25.

42. *Empidonax flaviventris*, Bd. — Yellow-bellied Flycatcher. Spring and autumn visitant; rather rare; perhaps some breed, specimens having been taken July 28. Arrives the first week in May; in autumn remains until third week in September. Found in same situations as *E. minimus.*

43. *Turdus mustelinus*, Gm.—Wood Thrush. "Wood Robin." Summer resident. Many breed, but the greater number go further north. Arrives last week in April; leaves last week in October. Frequents thick and tangled woods, especially laurel brakes, &c., along the banks of Rock creek.

44. *Turdus pallasi*, Cab.—Hermit Thrush. Spring and autumn visitant; none breed. Arrives much the earliest of all the thrushes, and immediately becomes very abundant. Frequents chiefly open woods. Arrives third week in March, and remains until May; arrives in the fall the first week in October, and leaves about the third.

45. *Turdus fuscescens*, Steph.—Tawny Thrush. Spring and autumn visitant. Rather uncommon, being the rarest of the thrushes. Does not usually arrive until the first week in May; remains but a short

time; returns early in the fall. Frequents high open woods, but keeps near the ground. Shy and solitary.

46. *Turdus swainsoni*, Cab.—Olive-backed Thrush. Spring and autumn visitant; none breed. The most abundant of the thrushes, except perhaps *T. pallasi*. Have seen them in considerable flocks in the fall. Arrives the second week in April; remains but a short time. Returns in the fall, second week in September; remains till second week in October.

47. *Turdus aliciae*, Bd.—Gray-cheeked Thrush. Spring and autumn visitant; none breed. Apparently as abundant as *T. swainsoni*, more so than *T. fuscescens*. Found in similar situations with the former, with which its times of arrival and departure are nearly identical; perhaps fonder of swampy localities. (First shown to belong to the eastern Avi-fauna by ourselves. See Proc. Acad. Nat. Sci., Philada., Aug., 1861.)

48. *Turdus (Planesticus) migratorius*, Linn.—Robin. Permanent resident. A few breed, and a few remain during the winter; the greater part, however, proceed north in summer and south in winter. Most abundant in November and March. Sour gum and poke-berries (*Phytolacca decandra*) are their favorite food. Found in all localities. Many nest in the parks about the Capitol and President's House.

49. *Sialia sialis*, (Linn.,) Bd.—Blue Bird. Very abundant. Permanent resident. Disappears in severe weather in winter, but is found on warm, sunny days throughout that season, and becomes exceedingly numerous on the first opening of spring. Breeds plentifully in holes of trees and in boxes throughout the city.

50. *Regulus calendulus*, (Linn.,) Licht.—Ruby-crowned Kinglet. Spring and autumn visitant. Very abundant. None breed. In spring, from April 1 to May 10; in fall, through the month of October and first few days in November. Frequents orchards, thickets, copses, cedar patches, &c.; less frequently found in high woods. Is most numerous in the fall. Is in full song before it leaves. Spring migrations always embrace a number of both sexes, with the head perfectly plain.

51. *Regulus satrapa*, Licht.—Golden-crested Kinglet. Winter resident. Abundant from October 1 to latter part of April. None breed. Habits much the same as the preceding. Thick pine woods a favorite resort. Familiar and unsuspicious.

52. *Anthus ludovicianus*, (Gm.,) Licht.—Titlark. "Skylark." Winter resident. Abundant. Makes its appearance towards the end of October, and remains until April. Always found in restless straggling flocks, usually of considerable extent. Frequents open commons, bare meadows, ploughed fields, &c. Has a remarkable habit of frequently alighting on the roofs of houses and sheds. [Breeds in great numbers in Labrador.]

53. *Mniotilta varia*, (Linn.,) Vieill.—Black and White Creeper. "Sapsucker." Very common summer resident, but more abundant in spring and fall, as the greater number go further north to breed. Arrives first week in April, and is exceedingly numerous until May. Breeds in holes in trees. Generally found in high, open woods.

54. *Parula americana*, (Linn.,) Bon.—Blue Yellow-back Warbler.

Spring and autumn visitant. Exceedingly abundant from April 25 till May 15. Perhaps a few breed, as we have found them the first week in August. In fall abundant from August 25 to second week in October. Inhabits exclusively high, open woods, and usually seen in the tops of the trees, or at the extremities of the branches, in the tufts of leaves and blossoms. (*Albino* obtained.)

55. *Protonotaria citrea*, (Bodd.,) Bd.—Prothonotary Warbler. Exceedingly rare; perhaps only an accidental visitor. An individual seen in a swampy briar patch May 2, 1861. Probably its most northern range, if regularly found here.

56. *Geothlypis trichas*, (Linn.,) Cab.—Maryland Yellow-throated Warbler. Very abundant summer resident, breeding in great numbers. Arrives April 25, becoming exceedingly numerous on its first appearance. Remains until October. Inhabits the densest briar patches, generally in swampy situations. Never seen in high woods, seldom in orchards or hedgerows. Associates with *Cistothorus palustris*, in the *Zizania aquatica* marshes. Nest on ground.

[*G. philadelphia* is undoubtedly an inhabitant of the District.]

57. *Oporornis agilis*, (Wils.,) Bd.—Connecticut Warbler. Rather uncommon in the fall, during the month of October. Excessively rare in spring; we never have seen it in that season. Frequents old buckwheat and corn fields, searching for food among the dry, rank weeds; also low thickets in swampy places.

58. *Oporornis formosus*, (Wils.,) Bd.—Kentucky Warbler. Rare. Found chiefly in low woods with thick undergrowth, ravines, &c. Very silent, but not shy. A few breed here.

59. *Icteria viridis*, (Gm.,) Bon.—Yellow-breasted Chat. Summer resident, breeding very abundantly. Arrives the last week in April, leaves about the middle of September. Frequents exclusively most dense and impenetrable briar patches. Males exceedingly shy and difficult to procure until the females commence incubation, when they are quite the reverse.

60. *Helmitherus vermivorus*, (Gm.,) Bon.—Worm-eating Warbler. Rather uncommon summer resident, breeding sparingly. Arrives first week in May, remains till third week in September. Slow and sedate in its movements.

61. *Helminthophaga chrysoptera*, (Linn.,) Cab.—Golden-winged Warbler. Spring and autumn visitant. Very rare.

62. *Helminthophaga pinus*, (Linn.,) Baird.—Blue-winged Yellow Worm-eating Warbler. Spring and autumn visitant. Very rare.

63. *Helminthophaga ruficapilla*, (Wils.,) Bd.—Nashville Warbler. Spring and autumn visitant. Rare.

64. *Helminthophaga peregrina*, (Wils.,) Cab.—Tennessee Warbler. Spring and autumn visitant. Very rare.

[Our observations warrant the belief that all the *Helminthophagæ* are exceedingly rare. Though the four species given have been detected, the data with regard to their arrival and departure have not been ascertained.]

65. *Seiurus aurocapillus*, (Linn.,) Sw.—Golden-crowned Wagtail. Exceedingly abundant summer resident. Arrives April 12; for about two weeks keeps perfectly silent, hiding in the thickets and

laurel brakes, (*Kalmia latifolia*,) so that its loud, harsh notes are not heard until the first of May, when they fill the woods, greatly to the annoyance of the collector searching for rarer and more retiring species. Found in high woods, especially where there is an undergrowth. Is *not* aquatic in any sense, but keeps on the ground rustling among the dry leaves for insects, and when disturbed flies to the nearest tree.

66. *Seiurus noveboracensis*, (Gm.,) Nutt.—Water Wagtail. Quite common in spring and fall; also breeds sparingly, having been found in July. Arrives in spring about May 1. Is eminently aquatic; swampy thickets, thick gloomy woods interspersed with puddles, where it associates with *Rhyacophilus solitarius*, are favorite resorts.

67. *Seiurus ludovicianus*, (Vieill.,) Bon.—Large-billed Water Wagtail. This bird, generally considered so rare, we have found to be not at all uncommon at certain seasons in particular localities. From the 20th of April to the 10th of May it may always be obtained, by an acute collector, in the dense laurel brakes which border the banks of and fill the ravines leading into Rock creek and Piney branch. We think we have seen it in June, which would prove it to breed here, as is, indeed, very probable. We have not detected it in the fall. It is usually very shy, darting at once into the most impenetrable brakes; but we have sometimes seen it quite the reverse, and have shot a pair, one after the other, as they sat in full view before me unconcernedly wagging their tails. We have nearly always found it in *pairs*, even as early as April 20. Its note is a sparrow-like chirp, like that made by striking two pebbles together; but it has also a loud and most beautiful and melodious song, the singularity of which first drew our attention to it.

68. *Dendroica virens*, (Gm.,) Bd.—Black-throated Green Wood-warbler. Spring and autumn visitant. None breed. In spring, from May 1 to 20; in fall, from September 7 to October 1. High open woods. Abundant.

69. *Dendroica canadensis*, (Linn.,) Bd.—Black-throated Blue Wood-warbler. Like the preceding, but rather less numerous.

70. *Dendroica coronata*, (Linn.,) Gray.—Yellow-rumped Wood-warbler. Winter resident. Exceedingly abundant. Arrive second week in October and remain until second week in May. Moult during the whole month of April, but before they leave are in full spring dress, though they have no song here. Most abundant in April and October, less so in depth of winter. Fond of hedges, orchards, copses, &c., but found everywhere. (*Albino* obtained.)

71. *Dendroica blackburniae*, (Gm.,) Bd.—Blackburnian Wood-warbler. Spring and autumn visitant. None breed. In spring, from May 1 to 20; in fall, from September 1 to 25. High open woods. Common.

72. *Dendroica castanea*, (Wils.,) Bd.—Bay-breasted Wood-warbler. Spring and autumn visitant. None breed. May 1 to 20; September 1 to 30. More abundant in fall than in spring. High open woods; sometimes laurel brakes, &c.

73. *Dendroica pinus*, (Wils.,) Bd.—Pine-creeping Wood-warbler. Summer resident. Arrives early in March, and stays until October.

Not very abundant at any time, and breeds but sparingly. High open woods. Pine and spruce forests.

74. *Dendroica pennsylvanica*, (Linn.,) Bd.—Chestnut-sided Wood-warbler. Spring and autumn visitant. None breed. In spring, from May 1 to 25; in fall, from September 1 to 20. High open woods. Abundant.

75. *Dendroica striata*, (Forst.,) Bd.—Black-poll Wood-warbler. Spring and autumn visitant. None breed. In spring, from May 7 to June 1; in fall, September 7 to second week in October. Arrive latest in both spring and fall, and stay latest of all the migratory warblers. Are the most numerous at both seasons, but especially abundant in the fall. High open woods.

76. *Dendroica aestiva*, (Gm.,) Bd.—Summer Yellow Wood-warbler. Summer resident. Very abundant. Breeds in numbers throughout the city, placing the nest in the forks of garden and fruit trees. Arrives April 25; leaves early in September. Never found in high open woods with the other Dendroicæ, but frequents orchards, gardens, &c.; also swampy copses.

77. *Dendroica maculosa*, (Gm.,) Bd.—Black and Yellow Wood-warbler. Spring and autumn visitant. None breed. Arrives first week in May; remains till the third. In fall, from September 1 to October 7. High open woods. Abundant.

78. *Dendroica tigrina*, (Gm.,) Bd.—Cape May Wood-warbler. Exceedingly rare. A single specimen obtained September 12, 1859. Times of arrival and departure probably identical with those of D. virens, canadensis, &c.

79. *Dendroica superciliosa*, (Bodd,) Bd.—Yellow-throated Wood-warbler. Entirely accidental visitor. One specimen obtained in 1842, and now in Smithsonian collection.

80. *Dendroica discolor*, (Vieill.,) Bd.—Prairie Wood-warbler. Mostly spring and autumn visitant, being quite abundant during those seasons. A few, however, breed. Arrives earlier than most of the Dendroicæ, about April 20. Frequents almost exclusively cedar patches and pine trees, and has very peculiar manners and notes.

81. *Dendroica palmarum*, (Gm.,) Baird.—Yellow Red-poll Wood-warbler. Spring and autumn visitant. Rather rare. None breed. Arrives about May 1; in fall, late in September, and does not leave till middle of October, after all the other warblers but Dend. coronata have taken their departure. Frequents old corn and buckwheat fields, associating with various species of sparrows; differing in this respect from all others of its genus, and resembling Oporornis agilis.

[There are twenty-two species of Dendroica found in North America; of these, fourteen have been observed here. Not one is a permanent resident; three only (D. pinus, aestiva, discolor) breed; one (D. coronata) is a winter resident. Nine others are spring and fall visitants; of these, seven (D. virens, canadensis, blackburniae, castanea, pennsylvanica, striata, maculosa) do not differ materially in numbers, habits, or times of arrival and departure; one (D. palmarum) differs in times of arrival and departure, and very remarkably in habits; one (D. superciliosa) is an accidental visitor; one (D. tigrina) is exceed-

ingly rare. In addition, Dendroica cærulea is undoubtedly to be found here.]

82. *Myiodioctes mitratus*, (Gm.,) Aud.—Hooded Warbler. Rare spring and autumn visitant. Perhaps some breed.

83. *Myiodioctes pusillus*, (Wils.,) Bon.—Green Black-capped Flycatcher. Rare spring and autumn visitant. A few may breed.

84. *Myiodiocies canadensis*, (Linn.,) Aud.—Canada Flycatcher. Spring and autumn visitant. Abundant. Frequents high, open woods, keeping mostly in the lower branches of the trees, and also the more open undergrowth of marshy places. Arrives the last week in April, and remains about two weeks; arrives in fall the first week in September, and stays until the fourth.

85. *Setophaga ruticilla*, (Linn.,) Sw.—Redstart. Chiefly spring and autumn visitant. But very few breed. Exceedingly abundant in spring from April 25 to May 20, and in fall from September 1 to 20; in all woody or swampy situations. Has a habit of running along little twigs sideways. Note very similar to that of *Dendroica æstiva.*

86. *Pyranga rubra*, (Linn.,) Vieill.—Scarlet Tanager. Spring and autumn visitant. A few breed. In spring, from first to last week in May; in fall, from September 1 to 20. Common, but only found in high, open woods.

87. *Pyranga æstiva*, (Linn.,) Vieill.—Summer Red Bird. Summer resident. Not abundant. Arrives May 1; leaves towards the latter part of September. Frequents entirely high woods, especially those that have much undergrowth.

88. *Hirundo horreorum*, Barton.—Barn Swallow. Exceedingly abundant summer resident. Arrives March 25, and remains until September 12. Breeds in barns, out-houses, &c.

89. *Hirundo lunifrons*, Say.—Cliff Swallow. Summer resident, but not so abundant as preceding, from scarcity of good breeding places. Arrives last week in April, and remains until September 12.

90. *Hirundo bicolor*, Vieill.—White-bellied Swallow. Summer resident. Common, but not nearly so much so as *H. horreorum*. Arrives first week in April, and remains until third week in September.

91. *Cotyle (Cotyle) riparia*, (Linn.,) Boie.—Bank Swallow. Summer resident; the most abundant of the swallows; more so in fall than in spring. Arrives second week in May; departs about the middle of September. Eminently gregarious at all seasons. (*Albino* obtained.)

92. *Cotyle (Stelgidopteryx) serripennis*, (Aud.,) Bon.—Rough-winged Swallow. Summer resident. Rather rare. Arrives third week in April; leaves about the middle of September.

93. *Progne purpurea*, (Linn.,) Boie.—Purple Martin. Summer resident. Common. Arrives May 1; leaves first week in September. Many breed in the city and about the public buildings.

94. *Ampelis cedrorum*, (Vieill.,) Bd.—Cedar Waxwing. "Cedar Lark." Resident all the year. Abundant, particularly in the fall. Gregarious; almost always seen in flocks. Breeds latest of the summer residents, being in flocks as late as first week in June.

95. *Collyrio borealis*, (Bon.,) Bd.—Great Northern Shrike. Very

rare. Perhaps its southern limit. Seen only in severe winter weather.

96. *Vireo (Vireosylvia) olivaceus*, (Linn.,) Vieill.—Red-eyed Vireo Summer resident. Found in all the high, open woods, from April 20 to September 25. The most abundant summer resident.

97. *Vireo gilvus*, (Vieill.,) Bon.—Warbling Vireo. Summer resident. Common. Arrives April 20, and remains until September 20. Frequents orchards, gardens, &c.; also, sometimes, low, thick swamps, and is especially abundant *in the city*, breeding in the high sycamore and poplar trees. Very seldom seen in woods with other vireos.

98. *Vireo (Lanivireo) solitarius*, (Wils.) Vieill.—Blue-headed Vireo. Spring and autumn visitant. (Some breed?) Arrives in spring April 25; leaves in fall October 20. Rarest of the *vireos*. Inhabits high, open woods, associating with *V. olivaceus* and *V. flavifrons*.

99. *Vireo (Lanivireo) flavifrons*, Vieill.—Yellow-throated Vireo. Summer resident. Abundant. Arrives April 25; remains until September 25. High, open woods. [*Vireo philadelphicus*, Cass., has never been actually detected, but is undoubtedly a very rare inhabitant of the District.]

100. *Mimus polyglottus*, (Linn.,) Boie.—Mocking Bird. Summer resident; but rare. Arrives April 25; departs about the middle of September.

101. *Mimus carolinensis*, (Linn.,) Gray.—Cat Bird. Summer resident. Exceedingly abundant. Found in all briar patches, along fences, and in thickets. Arrives in spring, the 3d week in April. Seems rather careless in concealing its nest, but very solicitous in protecting it. Departs about October 15.

102. *Harporhynchus rufus*, (Linn.,) Cab.—Thrasher. "French Mocking Bird;" "Sandy Mocking Bird." Summer resident. Abundant. Arrives April 20, departs first week in October.

103. *Thriothorus ludovicianus*, (Linn.,) Bon.—Great Carolina Wren. Permanent resident. Not abundant, but most so in the summer; breeds in thick shrubbery, &c., about gardens; at other seasons is very shy and unfamiliar.

104. *Cistothorus (Telmatodytes) palustris*, (Wils.) Bd.—Long Billed Marsh Wren. Summer resident. Arrives 3d week in April, leaves early in October. Very abundant, but only in certain localities; chiefly in the tracts of *Zizania aquatica*, which border the Potomac and Anacostia rivers [*Cistothorus stellaris*, though we have not been able to detect it, is doubtless found sparingly here.]

105. *Troglodytes ædon*, Vieill.—House Wren. Summer resident. Very abundant. Arrives April 15, leaves October 20. Breeds in boxes, out-houses, sheds, &c., and in orchards.

106. *Anorthura hyemalis*, (Wils.)—Winter Wren. Winter resident; rather uncommon. Arrives 1st week in October; remains until latter part of April. Frequents thick briar patches in dark woods, and the rocks and gullies about ravines and the sides of creeks.

107. *Certhia americana*, Bon.—Brown Creeper. Resident all the year. High, open woods. Abundant.

108. *Sitta carolinensis*, Gm.—White-bellied Nuthatch. Resident all the year. Very abundant, especially in fall. High, open woods.

109. *Sitta canadensis*, Linn.—Red-bellied Nuthatch. Winter resident. Arrives early in October, and remains until May. Rather rare. High, open woods, pine forests.

110. *Polioptila cærulea*, (Linn.,) Sclat.—Blue-Gray Gnatcatcher. Summer resident. Arrives early, the first week in April; remains until latter part of September. Very abundant. Breeds in high, open woods; on its first arrival frequents tall trees on the sides of streams, orchards, &c.

111. *Lophophanes bicolor*, (Linn.,) Bon.—Permanent resident, but the greater number breed further north. Exceedingly abundant, especially in fall. Found in all situations.

112. *Parus atricapillus*, Linn.—Black-capped Chick-a-dee. Winter resident.

113. *Parus carolinensis*, Aud.—Carolina Chick-a-dee. Summer resident. (Owing to the close resemblance of these two species, we have not been able to detect their times of arrival and departure.)

114. *Eremophila cornuta*, (Wils.,) Boie.—Sky-lark. Winter resident. Arrives November 1; remains until April. Abundant. Inhabits, *exclusively*, bare level meadows and open commons. Eminently gregarious while here.

115. *Pinicola canadensis*, (Briss.,) Cab.—Pine Grosbeak. An exceedingly rare and probably only accidental visitant in severe winters.

116. *Carpodacus purpureus*, (Gm.,) Gray.—Purple Finch. Winter resident; very abundant; eminently gregarious. Arrives early in October, and remains until May. Stragglers are seen through the greater part of that month, but the majority depart as soon as the leaves are fully expanded. High, open woods; feeding chiefly (entirely in spring) on tender young buds. Are in full song before they take their departure.

117. *Chrysomitris tristis*, (Linn.,) Bon.—Gold Finch. "Briar Bird." Permanent resident. Exceedingly abundant. Breeds in numbers throughout the city, building in the crotches of poplars and maples. In winter gregarious, collecting in very large flocks about the 25th of September, and continuing so until May. Is in dull plumage as long as it remains in flocks.

118. *Chrysomitris pinus*, (Wils.,) Bon.—Pine Finch. Winter resident; rather uncommon; always found in flocks, frequently associating with *C. tristis*. Remains until May.

119. *Ægiothus linaria*, (Lin.,) Cab.—Common Red-poll Linnet. Rare, perhaps only accidental visitant in severe winters, when it appears in restless flocks of greater or less extent.

[The two species of Cross-bills—*Curvirostra americana* and *leucoptera*—undoubtedly sometimes make their appearance in severe winters, though we have not been able to ascertain the fact with certainty.]

120. *Plectrophanes nivalis*, Meyer.—Snow Bunting. Rare visitant in the depth of winter.

[*P. lapponicus* may very possibly visit us occasionally.]

121. *Passerculus savanna*, (Wils.,) Bon.—Savanna Sparrow. Chiefly spring and autumn visitant; a few doubtless winter in secluded situations; none breed. Very numerous on low, moist meadows and watery savannas from March 15 to first week in May, and from October 10 to November 10. Shy and retiring; associate in companies; keep always on the ground. Are in full song before they depart.

122. *Pooecetes gramineus*, (Gm.,) Bd.—Bay-winged Bunting. Grass Finch. Resident all the year; very numerous in spring and autumn, less so in summer and winter. Frequent high dry fields, road sides, &c.

123. *Coturniculus passerinus*, (Wils.,) Bon.—Yellow-winged Sparrow. Summer resident; abundant. Arrives April 25; remains until October 15. Inhabits exclusively meadows and fields, keeping closely concealed in the grass. Usually solitary.

124. *Coturniculus henslowi*, (Aud.,) Bon.—Henslow's Bunting. Summer resident; exceedingly rare. (But one specimen known to have been obtained.)

125. *Zonotrichia leucophrys*, (Forst.,) Sw.—White-crowned Sparrow. Winter resident. Usually rare, but more plenty at irregular intervals; (e. g., in spring of 1861.) Remains until second week in May.)

126. *Zonotrichia albicollis*, (Gm.,) Bon.—White-throated Sparrow. Chiefly spring and autumn visitants, but numbers spend the winter in sheltered localities. Arrives early in October, and is exceedingly abundant during that month; becomes very numerous again the 1st of April and continues so until May 12. Mostly gregarious; frequent chiefly briar patches, hedges, roadsides, &c., in fall and winter, but in spring found on the ground in open woods. Sings both in fall and spring.

127. *Junco hyemalis*, (Linn.,) Sclat.—Snow Bird. Winter resident. Arrive in fall, October 10 or 12; soon become very numerous, and continue so until 15th of April. Stragglers seen till May. Found everywhere; in pleasant weather keep close in thickets, ravines, &c., but in severe weather approach farm-houses and scatter through the city. Gregarious; in full song before they leave.

128. *Spizella monticola*, (Gm.,) Bd.—Tree Sparrow. The most abundant winter sparrow except *Melospiza melodia*. Arrives 1st of November and leaves 1st of April; shy and retiring; chiefly gregarious. Found in thickets, briar patches, &c. Sings all through the winter.

129. *Spizella socialis*, (Wils.,) Bon.—Chipping Sparrow. Summer resident. Semi-domesticated, like *Troglodytes aedon;* breeds in orchards, gardens, shrubbery, about porches, &c. Especially fond of building the nest in small cedar bushes. March 10 to October 10.

130. *Spizella pusilla*, (Wils.,) Bon.—Field Sparrow. Resident all the year; especially abundant in spring; less so in summer and autumn; only found in secluded situations in winter. In full song in spring and occasionally sings in fall. Gregarious, except during the breeding season. Breeds in small, isolated bushes in fields, near the ground. (*Albino* obtained.)

131. *Melospiza melodia*, (Wils.,) Bd.—Song Sparrow. Permanent

resident. Excessively abundant, especially in winter, when it associates in large companies in briar patches and along tangled borders of streams.

132. *Melospiza palustris*, (Wils.,) Bd.—Swamp Sparrow.—Chiefly spring and autumn visitant; arrive in spring last week in April; become abundant in the fall, second week in October; very secluded and retiring in habits. Gregarious in fall.

[*Melospiza lincolni* is, in all probability, an inhabitant of the District, though we have never succeeded in detecting it.]

133. *Passerella iliaca*, (Merrem,) Sw.—Fox-colored Sparrow. Chiefly spring and autumn visitant, though some spend the winter in sheltered situations. Abundant from November 1 to 30, and from March 1 to 30. Eminently gregarious; inhabits thickets and the densest briar patches and laurel brakes. Sing just before departing; none breed.

134. *Euspiza americana*, (Gm.,) Bon.—Black-throated Bunting. Summer resident. Arrives May 1; leaves towards the end of September. Inhabits open fields and meadows. Abundant, especially in the spring.

135. *Guiraca ludoviciana*, (Linn.,) Sw.—Rose-breasted Grosbeak. Rare. Summer visitant; seen only at intervals. Found in high, open woods; generally in small companies. Shy and difficult to procure.

136. *Guiraca cærulea*, (Linn.,) Sw.—Blue Grosbeak. Summer resident. Rather rare. Breeds in much the same places as does *Cardinalis virginianus;* at other times found in more open situations, orchards, sparse woods, &c. Arrives first week in May; departs about middle of September.

137. *Cyanospiza cyanea*, (Linn.,) Bd.—Indigo Bird. "Little Blue Bird." Summer resident. Common. Arrives 1st of May; remains until second week in September. About orchards, edges of woods, meadows, &c.

138. *Cardinalis virginianus*, Bon.—Cardinal Grosbeak. "Red Bird." Resident all the year. Abundant, but always shy and difficult to procure. Frequents only the thickest briar patches. Moults from middle of July till October.

139. *Pipilo erythrophthalmus*, (Linn.,) Vieill.—Towhe Bunting. "Marsh Robin." Chiefly spring and autumn visitant; a few breed. Very abundant from April 25 to May 10, and from first to third week in October. Thickets, laurel brakes, &c.; partially gregarious.

140. *Dolichonyx oryzivorous*, (Linn.,) Sw.—Bob-o'-link. "Reed Bird." Spring and autumn visitant. In spring distributed abundantly about orchards and meadows, even at that season generally in flocks, from May 1 to 15; in autumn frequent in immense flocks the tracts of *Zizania aquatica*, along the river; also cornfields, &c., from August 20 to October.

141. *Molothrus pecoris*, (Gm.,) Sw.—Cowpen Bird. "Cow Bird." Summer resident. Not very common. Arrives second week in March; remains till October.

142. *Agelaius phœniceus*, (Linn.,) Vieill.—Red-winged Black Bird. Resident nearly all the year; more abundant in spring and fall, especially the latter. Breed. Commence to flock over the tracts of

Zizania aquatica and the neighboring cornfields the first week in August. Arrive in small flocks early in March.

143. *Sturnella magna*, (Linn.,) Sw.—Meadow Lark. Field Lark. Resident all the year. Abundant. Collect in flocks, sometimes of great extent, and then are very shy. Old fields, meadows, &c.

144. *Icterus baltimore*, (Linn.,) Daudin.—Baltimore Oriole. Chiefly spring and autumn visitant, though many breed. Arrives the first week in May, and remains until latter part of September. Orchards; high, open woods.

145. *Icterus spurius*, (Linn.,) Bon.—Orchard Oriole. Summer resident. Not uncommon. Arrives first week in May; remains till latter part of September. Orchards, meadows, and high, open woods.

146. *Scolecophagus ferrugineus*, (Gm.,) Sw.—Rusty Grackle. "Black Bird." Winter resident. Abundant. Strictly gregarious. Arrives third week in October; remains until April. Swampy localities; also ploughed fields, &c.

147. *Quiscalus versicolor*, (Linn.,) Vieill.—Purple Grackle. "Crow Black Bird." Summer resident. Abundant, but more particularly so in spring and fall. Arrives about March 15; departs late in October.

148. *Corvus americanus*, Aud.—Common Crow. Resident all the year. Very abundant. Found everywhere. Gregarious in winter. Less abundant during the breeding season.

149. *Corvus ossifragus*, Wils.—Fish Crow. Resident all the year. Abundant. Less wary and suspicious than the preceding, and more confined to the borders of the rivers. Confounded with the preceding generally.

150. *Cyanura cristata*, (Linn.,) Sw.—Blue Jay. "Jay Bird." Resident all the year. Abundant, especially in fall and winter, when it is partially gregarious. Found everywhere.

151. *Ectopistes migratoria*, (Linn.,) Sw.—Wild Pigeon. Make their appearance in flocks at irregular intervals throughout the fall, winter, and early spring months.

152. *Zenaidura carolinensis*, (Linn.,) Bon.—Carolina Turtle Dove. "Dove." Permanent resident. Not very abundant. Sometimes collect in large flocks in the fall, when they frequent cornfields, &c.

153. *Chamæpelia passerina*, (Linn.,) Sw.—Ground Dove. An entirely accidental visitor from the south.—(One specimen obtained, now in museum S. I.)

154. *Meleagris gallopavo*, Linn.—Wild Turkey. Regularly seen in the markets all through the winter, though not often found in the immediate vicinity of the city. Remains all the year in the neighboring districts.

155. *Bonasa umbellus*, (Linn.,) Stephens. Ruffed Grouse. "Pheasant." Resident all the year. Apparently not uncommon, but frequent mostly impenetrable laurel brakes, &c., and are difficult to procure.

156. *Ortyx virginianus*, (Linn.,) Bon.—American Partridge. "Partridge." Resident all the year. Still abundant in the immediate vicinity of the city during the late fall and winter months.

157. *Grus canadensis*, (Linn.,) Temm.—Sand-hill Crane. Exceedingly rare; perhaps only accidental. (Specimen obtained.)

158. *Garzetta candidissima*, (Jacq.,) Bon.—Snowy Heron. Not uncommon about the marshes of the Potomac in early fall.

159. *Herodias egretta*, (Gm.,) Gray.—White Egret. Occasionally seen along the river in the late summer and early fall months.

160. *Ardea herodias*, Linn.—Great Blue Heron. "Blue Crane." Found at intervals during the summer and early autumn along the marshes bordering the river.

161. *Florida cærulea*, (Linn.,) Bd.—Little Blue Heron. Rare, perhaps only accidental, towards the end of summer. (Specimen obtained.)

162. *Ardetta exilis*, (Gm.,) Gray.—Least Bittern. Summer resident; rather uncommon. Arrives early in May; departs late in September. Found chiefly in the *Zizania aquatica* marshes.

163. *Botaurus lentiginosus*, Steph.—Bittern. "Indian Hen." "Sage Hen." Resident all the year. Common. Only heron that winters here.

164. *Butorides virescens*, (Linn.,) Bon.—Green Heron. "Fly-up-the-creek." Summer resident. Most abundant of the herons. Arrives 1st of May; remains until middle of September. Numerous about Rock creek and the marshes and creeks of the Potomac.

165. *Nyctiardea gardeni*, (Gm.,) Bd.—Night Heron. Rare; seen occasionally during the latter part of summer.

166. *Charadrius virginicus*, Borck.—Golden Plover. "Bull-head Plover." Spring and autumn visitant. Passes quickly through in early spring; is more numerous in autumn, during latter part of October and whole of November, about fields, ploughed land, &c.

167. *Ægialitis (Oxyechus) vociferus*, (Linn.,) Cass.—Killdeer Plover. "Killdee." Resident all the year, or nearly so. Most numerous early in spring and late in autumn; generally seen in flocks, on meadows, commons, ploughed lands, &c.

[*Ægialitis semipalmatus* is undoubtedly an inhabitant of the District.]

168. *Philohela minor*, (Gm.,) Gray.—Woodcock. Resident all the year. Common. Frequent chiefly "Woodcock brakes" and moist cornfields; and in early spring low woods and thickets.

169. *Gallinago wilsonii*, (Temm.,) Bon.—Wilson's Snipe. "English" or "Jack" Snipe. Spring and autumn visitants. Abundant. Pass through early in the spring and return in the fall the first week in September, and remain about two weeks. In flocks in the fall.

[*Macrorhamphus griseus*, though we have not detected it, is doubtless an inhabitant of the District.]

[*Micropalama himantopus* may very possibly be hereafter detected.]

170. *Actodromas maculata*, (Vieill.,) Cass.—Pectoral Sandpiper. "Grass Snipe." Spring and autumn visitant. Rarely seen in spring. Not uncommon in autumn from September 25 to November. Low, moist, grassy meadows, boggy commons, &c. Seen singly as often as in flocks.

171. *Actodromas minutilla*, (Vieill.,) Coues.—Least Sandpiper.

Spring and autumn visitant. In spring from May 1 to 15; in fall from August 25 to October. In habits very similar to preceding.

172. *Ereunetes pusillus*, (Linn.,) Cass.—Semipalmated Sandpiper. Rare; perhaps accidental; occasionally met with in spring and fall along the banks of the river. [Possibly a second species, (*Ereunetes minor*, Gundl.)]

173. *Symphemia semipalmata*, (Gm.,) Hartl.—Willet. Rare; spring and autumn visitant.

174. *Gambetta melanoleuca*, (Gm.,) Bon.—Greater Tell-tale Tatler. "Yellow-shanks Plover." Spring and autumn visitant. Common. In spring, from May 1 to 15; in autumn, middle of September to November. Generally seen singly or two or three together. Banks of the rivers, boggy meadows, commons intersected with pools, &c.

175. *Gambetta flavipes*, (Gm.,) Bon.—Lesser Tell-tale Tatler. "Yellow-shanks Plover." Identical in times of appearance and in habits with preceding.

176. *Rhyacophilus solitarius*, Wils.—Solitary Tatler. Spring and autumn visitant; very abundant, especially in spring. May 1 to 15, and August 25 to October 15. Very familiar and unsuspicious; decidedly gregarious, both in spring and fall. Frequents ditches and puddles, in low, boggy commons, &c.

177. *Tringoides macularius*, (Linn.,) Gray.—Spotted Sandpiper. "Sand Snipe." Summer resident; very abundant in spring. The only sandpiper that breeds. Arrives April 20 and remains through greater part of September. Found chiefly on Rock creek and banks of the river.

178. *Actiturus bartramius*, (Wils.,) Bon.—Bartram's Tatler. Grass Plover. Field Plover. Summer resident; rare. Found altogether on high, open fields and ploughed lands.

179. *Numenius longirostris*, Wils.—Long-billed Curlew. Not uncommon. Spring and autumn visitant; remaining a very short time at each season. In fall, about the middle of September. Found in places similar to those which the Yellow-legs frequent.

180. *Rallus elegans*, Aud.—Fresh-water Marsh-hen. "King Ortolan." Found sparingly in early autumn in the marshes along the rivers, with the P. carolina.

181. *Rallus virginianus*, (Linn.)—Virginia Rail. Spring and autumn visitant. Very rare in the spring, and not abundant in the fall. Arrives in fall the last week in August; departs about the same time with the P. carolina.

182. *Porzana carolina*, Vieill.—Common Rail. Sora. Ortolan. Spring and autumn visitant. Rare in spring, but very abundant in fall from the last week in August until the first frost. Found exclusively in the marshes bordering the Potomac and Eastern Branch.

[*Porzana noveboracensis*, though not detected, is undoubtedly an inhabitant of the District.]

183. *Porzana jamaicensis*.—Black Rail. Very rare, perhaps only accidental, during the early fall. (Specimen seen by ourselves September, 1861.)

184. *Fulica americana*, Gm.—Coot. "Crow Duck." Spring and

autumn visitant; passing through early in the spring, and returning in the fall about the 1st of October. Very common in the fall.

185. *Cygnus americanus*, Sharpless.—American Swan. Winter resident. Not common. Seen sometimes on the river, and frequently exposed for sale in the market.

186. *Bernicla canadensis*, (Linn.,) Boie.—Canada Goose. Wild Goose. Winter resident. Common, but seen most frequently in the air, flying over. Arrive in fall just before the first approach of severe weather. Found in market through the winter.

187. *Anas boschas*, (Linn.)—Mallard. Very abundant winter resident. Found upon the Potomac and Anacostia rivers, and (more rarely) upon creeks and ponds.

188. *Anas obscura*, Gm.—Dusky Mallard. Black Mallard. Not rare. Habits same as those of preceding.

189. *Dafila acuta*, (Linn.,) Jenyns.—Pintail Duck. Sprig-tail. Winter resident. Common. Found mostly along the margins of the rivers, and sometimes inland. Arrive about the first of October.

190. *Nettion carolinensis*, (Gm.,) Baird.—Green-winged Teal. Winter resident. Abundant. Found chiefly along the marshes of the Potomac and Anacostia. Arrives sooner than most of the ducks, about the middle of September.

191. *Querquedula discors*, (Linn.,) Steph.—Blue-winged Teal. Winter resident. The most abundant of the ducks. Habits much as those of preceding.

192. *Chaulelasmus streperus*, (Linn.,) Gray.—Gadwall. Winter resident. Habits similar to those of the Mallard, with which it is often found associated, but it is less numerous.

193. *Mareca americana*, (Gm.,) Stephens.—Widgeon. Winter resident. Arrives in the fall about the first of October, and departs in spring during the month of April. Very abundant and not so difficult of approach as are most of the ducks.

194. *Aix sponsa*, (Linn.,) Boie.—Wood-duck. Summer Duck. Permanent resident; but more abundant in winter, being seldom seen in summer. Not very abundant at any time.

195. *Fulix marila*, (Linn.,) Bd.—Greater Black-head Duck. Winter resident. Not very abundant. Often exposed for sale in market, but not much esteemed for food.

196. *Fulix affinis*, (Forst.,) Bd.—Lesser Black-head Duck. Winter resident. Same as preceding.

197. *Fulix collaris*, (Donovan,) Baird.—Ring-neck Duck. Winter resident. Rare. Arrives in fall about the last week in September.

198. *Aythya americana*, (Eyton,) Bon.—Red-head duck. Winter resident. Very abundant. A common market duck, and frequently offered for sale as the canvas back. Found upon the "flats" of the rivers, and occasionally on inland marshes.

199. *Aythya vallisneria*, (Wils.,) Bon.—Canvas-back duck. Winter resident. At times exceedingly abundant. Highly prized by sportsmen and epicures. Habits much those of the preceding.

200. *Bucephala americana*, (Bon.,) Baird.—Golden-eye duck. Winter resident. Rather abundant. Frequently seen in the market.

201. *Bucephala albeola*, (Linn.,) Baird.—Buffel-headed duck; "Butter-ball." Winter resident. More common than preceding. Arrive in fall, about the middle of September; leave in spring, the second week in April.

202. *Harelda glacialis*, (Linn.,) Leach.—Long-tailed duck.

203. *Melanetta velvetina*, (Cass.,) Baird.—Velvet duck.

204. *Pelionetta perspicillata*, (Linn.,) Kaup.—Surf duck.

205. *Oidemia americana*, Swainson.—Scoter duck.

(The four preceding birds do not properly belong to the fauna of the District, being strictly marine birds. They are found at the mouth of the Potomac, and ascend it as far as the salt water reaches. Their appearance in this immediate locality must, however, be considered accidental. They are all to be seen in the market during the winter.)

206. *Erismatura rubida*, (Wils.,) Bon.—Ruddy duck. Winter resident. Abundant. Frequently exposed for sale in the market, but not esteemed for food.

207. *Mergus americanus*, Cassin.—Goosander. "Fishing duck." Winter resident. Not common. More frequently seen on creeks and millponds than on the rivers.

208. *Mergus serrator*, Linn.—Red-breasted merganser. "Fishing duck." Winter resident. Rather more common than the preceding. Found in much the same situations.

209. *Lophodytes cucullatus*, (Linn.,) Reich.—Hooded merganser. Winter resident. Rather rare.

210. *Thalassidroma leachii*, Bon.—Leach's Petrel. Accidental visitor. (Numbers were seen during a storm some years ago.)

211. *Puffinus*, ——? A shearwater, probably *P. obscurus*, has been detected in the District.

212. *Larus smithsonianus*,* Coues.—Herring gull. "Sea gull." Seen over the river through the winter. Not numerous. Exceedingly shy and wary.

213. *Larus delawarensis*, Ord.—Ring-billed gull. Seen about the river during the winter months. More numerous than the preceding.

214. *Chroicocephalus atricilla*, (Linn.,) Lawr.—Laughing gull. Occasionally seen during the late summer and early autumn months.

215. *Chroicocephalus philadelphia*, (Ord.,) Lawr.—Bonaparte's hooded gull. More abundant than the preceding, being quite common. Remains here through the winter.(?)

216. *Sterna aranea*, Wils.—Marsh Tern. Rare; only occasionally seen during the late summer and early fall months, over the marshes bordering the river.

217. *Sterna wilsonii*, Bon.—Wilson's Tern. An occasional visitor during the late summer and early fall months. [*Sterna forsteri* is undoubtedly to be found in the District.]

218. *Sterna frenata*, Gambel.—Least Tern. Not uncommon. Frequently seen over the marshes bordering the Potomac and Eastern Branch in August and September, and more rarely in spring.

219. *Hydrochelidon plumbea*, Wils.—Short-tailed Tern. "Little

* See Proc Acad. Nat. Sci., Philadelphia, June, 1862, p. 296.

Sea Gull." Less numerous than preceding, but found in similar localities and at much the same times.

220. *Rhynchops nigra*, Linn.—Black Skimmer. A rare, perhaps accidental, visitor during the summer. (Specimens seen by ourselves September 8, 1858, on the Potomac river.)

221. *Graculus dilophus*, Gray.—Double-crested Cormorant. A specimen has been detected.

222. *Colymbus torquatus*, Brunn.—Great Northern Diver. "Loon." Occasionally seen during the winter.

223. *Podiceps (Pedetaithya) holbolli*, Reinhardt.—Red-necked Grebe. Not uncommon on the Potomac during the winter months.

224. *Podiceps cristatus*, Lath.—Crested Grebe. "Water Witch." Found on the Potomac during the winter months.

225. *Podiceps (Dytes) cornutus*, Lath.—Horned Grebe. Common on Potomac in winter.

226. *Podilymbus podiceps*, (Linn.) Lawr.—"Dipper." "Water Witch." Abundant on the Potomac in winter. (We have not been able to ascertain the precise times of arrival and departure of the five preceding birds.)

The birds included in the preceding catalogue are now presented in sections to show at a glance those which are permanent, or summer, or winter residents, and those which are regular or accidental visitants. It is somewhat difficult to make out such an analytical table, from the fact that of some species undoubtedly to be classed as spring and autumn visitants a few individuals breed or pass the winter in secluded situations, and *vice versa* of those which regularly pass the summer or winter with us, many are more abundant in the spring and fall. We have endeavored to place each species in the class under which it most naturally falls, indicating irregularities of this sort in foot notes.

A.

PERMANENT RESIDENTS.

Cathartes aura.
Falco sparverius.
Accipiter cooperi.
Accipiter fuscus.
Buteo borealis.
Buteo lineatus.
Buteo pennsylvanicus.
Circus hudsonius.
Haliætus leucocephalus.
Scops asio.
Bubo virginianus.
Otus wilsonianus.
Brachyotus cassini.
Syrnium nebulosum.
Picus villosus.
Picus pubescens.
Sphyropicus varius.
Hylatomus pileatus.
Centurus carolinus.
Colaptes auratus.
Turdus migratorius.
Sialia sialis.
Ampelis cedrorum.
Thriothorus ludovicianus.
Certhia americana.
Sitta carolinensis.
Lophophanes bicolor.
Chrysomitris tristis.
Spizella pusilla.
Melospiza melodia.
Cardinalis virginianus.
Agelaius phœniceus.
Sturnella magna.
Corvus americanus.
Corvus ossifragus.
Cyanura cristata.
Zenaidura carolinensis.
Bonasa umbellus.
Meleagris gallopavo.
Ortyx virginianus.
Botaurus lentiginosus.
Ægialitis vociferus.
Philohela minor.
Aix sponsa.

B.

WINTER RESIDENTS.

Falco columbarius.
Aquila canadensis.
Ectopistes migratoria.
Chaulelasmus streperus.
Erismatura rubida.
Bucephala americana.

Anthus ludovicianus.
Regulus satrapa.
Dendroica coronata.
Collyrio borealis.
Anorthura hyemalis.
Sitta canadensis.
Parus atricapillus.
Eremophila cornuta.
Carpodacus purpureus.
Chrysomitris pinus.
Zonotrichia leucophrys.
Junco hyemalis.
Spizella monticola.
Scolecophagus ferrugineus.
Mareca americana.
Fulix marila.
Fulix affinis.
Fulix collaris.
Aythya americana.
Aythya vallisneria.
Cygnus americanus.
Bernicla canadensis.
Anas boschas.
Anas obscura.
Dafila acuta.
Nettion carolinensis.
Querquedula discors.
Bucephala albeola.
Mergus americanus.
Mergus serrator.
Lophodytes cucullatus.
Larus smithsonianus.
Larus delawarensis.
Chroicocephalus philadelphia.
Podiceps holbölli.
Podiceps cristatus.
Podiceps cornutus.
Podilymbus podiceps.

C.

SUMMER RESIDENTS.

Pandion carolinensis.
Coccygus americanus.
Coccygus erythrophthalmus.
Melanerpes erythrocephalus.
Trochilus colubris.
Chætura pelasgia.
Antrostomus vociferus.
Ceryle alcyon.
Tyrannus carolinensis.*
Myiarchus crinitus.
Sayornis fuscus.*
Contopus virens.
Empidonax acadicus.
Turdus mustelinus.
Mniotilta varia.*
Geothlypis trichas.
Icteria viridis.
Seiurus aurocapillus.
Seiurus noveboracensis.
Helmitherus vermivorus.
Dendroica aestiva.
Dendroica pinus.
Dendroica discolor.
Pyranga æstiva.
Hirundo horreorum.
Hirundo lunifrons.*
Hirundo bicolor.*
Cotyle riparia.
Cotyle serripennis.
Progne purpurea.
Vireo olivaceus.
Seiurus ludovicianus.
Vireo flavifrons.
Vireo gilvus.
Mimus polyglottus.
Mimus carolinensis.
Harporhynchus rufus.
Troglodytes ædon.
Cistothorus palustris.
Polioptila cærulea.
Parus carolinensis.
Pooecetes gramineus.
Coturniculus passerinus.
Coturniculus henslowi.
Spizella socialis.
Euspiza americana.
Guiraca ludoviciana.
Guiraca cærulea.
Cyanospiza cyanea.
Molothrus pecoris.
Icterus baltimore.*
Icterus spurius.
Ardea herodias.
Garzetta candissima.
Herodias egretta.
Butorides virescens.
Nyctiardea gardeni.*
Tringoides macularius.*
Actiturus bartramius.

* The greater number go further north.

D.

SPRING AND AUTUMN VISITANTS—MIGRATORY SPECIES.

Chordeiles popetue.
Empidonax traillii.*
Empidonax flaviventris.*
Empidonax minimus.
Turdus pallasii.
Turdus fuscescens.
Turdus swainsonii.
Turdus aliciæ.
Regulus calendula.†
Dendroica virens.
Dendroica canadensis.
Dendroica blackburniæ.
Dendroica castanea.
Dendroica pennsylvanica.
Dendroica striata.
Dendroica maculosa.
Dendroica tigrina.
Dendroica palmarum.
Pipilo erythrophthalmus.*
Dolichonyx oryzivorus.
Quiscalus versicolor.*
Ardetta exilis.*
Charadrius virginicus.
Gallinago wilsonii.
Actodromas maculata.
Actodromas minutilla.
Symphemia semipalmata.

Parula americana.
Oporornis agilis.*
Oporornis formosus.*
Helminthophaga pinus.
Helminthophaga chrysoptera.
Helminthophaga rufica-pilla.
Helminthophaga peregrina.
Myiodioctes mitratus.*
Myiodioctes pusillus.*
Myiodioctes canadensis.
Setophaga ruticilla.*
Pyranga rubra.*
Vireo solitarius.*
Passerculus savanna.
Melospiza palustris.
Passerella iliaca.†
Zonotrichia albicollis.†
Gambetta melanoleuca.
Gambetta flavipes.
Rhyacophilus solitarius.
Numenius longirostris.
Rallus elegans.
Rallus virginianus.
Porzana carolina.
Fulica americana.
Sterna frenata.
Hydrochelidon plumbea.

* A few may, in some cases certainly do, breed here.
† A few probably remain through the winter.

E.

ACCIDENTAL OR VERY RARE VISITORS.

Astur atricapillus.*
Nyctea nivea.*
Milvulus ———?
Protonotaria citrea.
Dendroica superciliosa.
Pinicola canadensis.*
Ægiothus linarius.*
Plectrophanes nivalis.*
Chamaepelia passerina.†
Porzana jamaicensis.
Grus canadensis.
Florida cærulea.†
Ereunetes pusillus.
Harelda glacialis.
Melanetta velvetina.
Pelionetta perspicillata.
Oidemia americana.
Thalassidroma Leachii.
Puffinus ———?
Chroicocephalus atricilla.†
Sterna aranea.
Sterna wilsoni.
Rhynchops nigra.†
Graculus dilophus.
Colymbus torquatus.*

* From the north in severe winters.
† From the south towards the end of summer.

F.

SOME SPECIES NOT INCLUDED IN THE LIST, WHICH ARE PROBABLY YET TO BE DETECTED IN THE DISTRICT.

Nauclerus furcatus.
Nyctale acadica.
Dendroica cærulea.
Vireo philadelphicus.
Cistothorus stellaris.
Curvirostra americana.
Curvirostra leucopterus.
Plectrophanes lapponicus.
Melospiza lincolni.
Aegialitis semipalmatus.
Macrorhamphus griseus.
Micropalama himantopus.
Porzana noveboracensis.
Sterna forsteri.
Geothlypis philadelphia.

SUMMARY.

Permanent residents	44
Winter residents	44
Summer residents	59
Regular visitants	54
Accidental visitants	25
Total	226

PRIZE QUESTIONS OF SCIENTIFIC SOCIETIES.

In accordance with a request from Utrecht, we give the following translation of the proceedings of several of the Holland societies, relative to prize questions proposed by these establishments for free competition to the citizens of all nations. We regret that we have not received a full set of these proceedings, but hope to present in a future report the remainder of the series.—*Sec. Sm. Inst.*

EXTRACT FROM THE PROCEEDINGS OF THE HOLLAND SOCIETY OF SCIENCE AT HARLEM, FOR THE YEAR 1856.

The society held its 104th annual session on the 17th of May, 1856. Since its last session it has received: 1st. A memoir, written in German, and having the epigraph, "*Nec aspera terrent.*" This memoir was written as a reply to the following question:

"A history is requested of the development of the *Petromyzon fluviatilis*, illustrated by the necessary figures, and compared with that of other fishes, according to the researches of Von Baer, Rathke, and C. Vogt."

This memoir does not, in fact, contain the history of the *Petromyzon fluviatilis*, but that of *P. Planeri*. However, this latter species is so near akin to the other, that the memoir substantially answers the purpose proposed for it by the society, and the gold medal is therefore awarded to the author, Dr. Max Sigmund Schultze, doctor of medicine and philosophy, and professor extraordinary of anatomy in the University of Halle.

The society has received: 2dly. A memoir, written in German, bearing the epigraph, "*Amicus Plato, amicus Socrates, sed magis amica veritas,*" and relative to the following question published by the society:

"The illustrious director of the University of Pulkowa, the Astronomer F. G. W. Struve, published in 1847 his well-known book, entitled "STUDIES IN STELLAR ASTRONOMY." In that work he communicates, as the result of his observations, some very remarkable details concerning the structure of the universe and the transparency of space. The London Astronomical Society, in its report of the twenty-eighth general meeting, gave the support of its authority to Struve's results, while, on the other hand, the celebrated astronomer J. F. Encke, in No. 622 of the *Astronomische Nachrichten*, considers them hypothetical and without foundation. The society, consequently, desires that a profound and scrupulous examination may

Subfamily AULOSTOMINÆ Gill.

AULOSTOMA Lac.

POLYPTERICHTHYS Bleeker.

Polypterichthys *Bleeker*, Natuurkundig Tijdschrift voor Nederlandsch Indie, vol. iv. p. 608.

Subfamily AULORHYNCHINÆ Gill.

AULORHYNCHUS Gill.

Subfamily SIPHONOSTOMINÆ Gill.

SIPHONOSTOMUS (Klein) Gron.

Fistularia *Linn.*
Channorhynchus *Cantor.*

Genus AULORHYNCHUS Gill.

Body moderately elongated and almost cylindrical. Tail from the dorsal and anal fins elongated conical and slightly depressed, merging into the very slender and depressed caudal peduncle. Skin naked. Lateral line marked by a continuous row of short canals. Head with the skin naked. Mouth small, horizontal, and at the end of a flexible tube about as long as the rest of the head. Intermaxillary bones much expanded, and with long and slender posterior processes. Teeth on the supramaxillary and dentary bones nearly uniserial. Palate edentulous. Nostril with raised margin, rather distant from front of eye. Branchiostegal rays 4—4. Dorsal spines numerous, equal and very short, commencing above the pectorals. Dorsal and anal fins posterior, nearly equal, oblong, and elevated in front. Caudal fin small and emarginated. Pectoral fins also emarginated, the superior and inferior rays being longest. Ventral fins inserted not far behind the bases of the pectoral ; each with a slender spine and five branched rays.

AULORHYNCHUS FLAVIDUS Gill.

Tawny, minutely punctulated with black above and on the sides, immaculate beneath. Snout with a lateral yellowish line. Operculum and suboperculum with a golden lustre : the former also punctulated above. Ante-pectoral or humeral region lustrous golden, bordered above by a blackish band parallel with the superior pectoral rays.

D. spines xxvi. D. 10. A. I. 10. P. 1, 18, 1. V. I. 5.

The proportions, in hundredths, are as follows :

Total length, 5 inches	100
Body—Height of body	6
" behind dorsal	4½
Width behind dorsal	4½
Head—Length of head	·25
Distance between snout and preoperculum	·18
" " " " orbit	·12
" " orbits	3
Height of head	5½
Greatest width of head	4½
Diameter of eye	4
Dorsal—Distance of dorsal fin from snout	·49
Length of dorsal fin	9
Greatest height	7

th the friendly Regards of the Author

Caudal—Length of median caudal rays	5
" longest caudal rays	6
Pectoral—Length of pectoral fins	·10
Distance from snout	·27½
Ventral—Length of ventral fins	5
Distance from snout	·31

A detailed description will be given in the Report on the Ichthyology of the North Western Boundary Survey.

Three specimens of the species were obtained.

A Monograph of the TRINGEÆ of North America.

BY ELLIOTT COUES.

In the latter part of 1860, during the examination at the Smithsonian Institution of an extensive and valuable collection of birds made by Messrs. Robert Kennicott and Bernard R. Ross in the vicinity of Great Slave Lake and McKenzie's River, my attention was directed to a Sandpiper, nearly allied to *Actodromas maculata* and *Bonapartei*, but differing from both in many important features. Subsequent examination having proved it to be without doubt distinct from these, or any other North American Sandpipers, I was authorized by the Secretary of the Institution to describe and name it. To do so properly, necessarily involving a somewhat extended study of the North American Sandpipers, I was induced to undertake a monographic sketch of the section, as well as of the particular genus to which the new species belongs.

In the following pages it has been attempted to present the leading features of the group; to give the diagnosis of the several genera and species, with a detailed description when such appeared necessary; together with the synonymy of each species and a discussion of doubtful points of nomenclature and affinity. In how far, however, this aim has been accomplished, must be left for others to judge.

It is with great diffidence that on some points I dissent from such high authority as that of the author of the *Tringeæ* in the General Report; but when compelled to do so, the reasons are fully stated, which, it is hoped, will be found satisfactory.

To Professor Henry, Secretary of the Smithsonian Institution, my grateful acknowledgments are due for the opportunity of examining at leisure the entire Smithsonian collection of Sandpipers, and also for access to those works necessary to the compilation of the list of synonyms. The references have all been personally made and verified, except in a few cases for which the authority is given. Though the list is necessarily incomplete, it is believed that no important synonym is omitted. Should, however, errors be detected in this or in any other portion of the article, it is hoped that they will be found to be others than those of negligence or carelessness.

By many modern ornithologists the Sandpipers are considered as a subfamily *Tringinæ* of *Scolopacidæ*, equal in rank to the *Scolopacinæ* and *Totaninæ*. But the relationships of the two former in all essential points are very intimate, and the transition from the one to the other, through such genera as *Macroramphus* and *Micropalama*, very gradual, while at the same time the differences from the *Totaninæ* are marked and decided. In view of these considerations, it may be more natural to consider the Sandpipers as a section of *Tringeæ* of equal rank with *Scolopaceæ*, uniting both under the subfamily *Scolopacinæ*. Upon this basis the different groups may be distinguished by the following brief characters, taken chiefly from the General Report.

Family *SCOLOPACIDÆ.*

Bill variable in length, but at least as long as the head, grooved to beyond the middle. Legs with transverse scutellæ before and behind, (except in *Numenieæ*.) Toes not broadly margined to the tips, with or without a basal web. Hind toe generally present.

Scolopacinæ. Bill covered with soft skin to the sensitive, vascular, usually more or less laterally expanded tip. Gape of mouth very small, not extending beyond the base of the culmen. Bare portion of tibiæ short. Legs generally rather short and stout. Toes usually cleft to the base. Body stout, neck rather short.

Totaninæ. Bill covered with soft skin only towards the base, the terminal portion being hard, horny, and usually unexpanded and attenuated. Gape of mouth considerable, extending beyond the base of the culmen. Tibiæ bare for a considerable distance. Legs slender and lengthened. Toes usually with a basal web.

Subfamily SCOLOPACINÆ.

Scolopaceæ. Bill much longer than the head or naked leg, extremely sensitive. Upper mandible with a longitudinal furrow near the end, and its tip thickened and bent down over the lower. Roof of mouth not excavated to the tip. External ear beneath or anterior to the eye. Tail usually banded.

Tringeæ. Bill shorter than the naked leg, the tip less sensitive than in the preceding, more or less laterally expanded, but not thickened. Roof of mouth excavated to the tip. Culmen without a decided longitudinal groove. External ear posterior to the eye. Tail usually without bands.

The preceding diagnoses indicate, in a general way, the principal characters of the several groups, and distinguish the *Tringeæ*. The latter, at least as far as North American forms are concerned, may be thus more definitely characterized.

The bill is straight or slightly decurved, at least as long as the head, and sometimes considerably exceeding it; rather slender, usually more or less compressed, seldom much depressed. The tip is usually more or less expanded, and sensitive and vascular, that of the upper mandible bent a little over that of the lower. The grooves in both mandibles extend to the expansion of the tip; that of the upper is much the widest, but both are deep and distinct. In some genera there are decided indications of a longitudinal furrow on the culmen near the end. The nostrils are linear, pervious, very narrow, situated in the sinus of the upper mandible, usually very near its base, but sometimes considerably advanced. The angle formed by the rami of the lower jaw is very small, the enclosed space being long and narrow, and the groove marking the line of union of the rami usually extending about two-thirds the length of the bill, but sometimes nearly to the tip. The extent of the encroachment of the feathers on the bill varies in the different genera; but, except perhaps in *Ancylocheilus*, it is always greater between the rami than on the sides. The wings are long, pointed and powerful; the first primary is usually the longest, but the second is nearly, sometimes quite, equal to it. The rest are all rapidly graduated. The secondaries are very short and inconspicuous. The edge of the outer vane is obliquely incised at the extremity. The tertials are usually long, slender and tapering, sometimes nearly equalling the primaries in length. The tail is rather short, usually doubly emarginate, the central feathers pointed, and projecting somewhat beyond the others. The legs and feet vary greatly in their character in the different genera, always, however, being constant in each. Except in *Arquatella* and *Tringa*, the tibiæ are always exposed for a considerable portion of the length of the tarsus, and in those genera the bare portion is considerable. Except in *Arquatella*, *Actodromas*, and perhaps *Ereunetes*, the tarsus is always decidedly

longer than the middle toe and claw. The toes are usually long and slender, more or less margined at the sides, and flattened underneath; free at the base, or with a very rudimentary membrane, except in *Micropalama* and *Ereunetes*. The lateral are nearly equal to the middle, the outer slightly longer than the inner. The hind toe is present, except in *Calidris*. The claws vary considerably in length, acuteness and amount of curvature, but they are always dilated on the inner edge.

With respect to coloration, the *Tringeæ* of North America, with scarcely the exception of *Arquatella maritima*, present a general similarity in the pattern and disposal of the markings of most of the parts. The feathers of the upper parts have their centres very dark, and are margined with some shade of reddish, yellowish, or white, the color being deepest on the scapulars. The primaries are uniformly deep dusky, without spots or bars, and are darkest at the tips and on the outer vanes. The shafts of all are white for some portion, usually the central. The secondaries are ashy-gray, bordered to a greater or less extent with white. The central tail feathers are usually considerably darker than the lateral; but neither show any approach towards the transverse bars so universal among the *Scolopaceæ* and *Totaninæ*. Any attempt, however, at a generalization of the color of the under parts seems impossible, since, as will be seen in the diagnoses of the species, they are found of very various patterns and colors.

The species inhabiting North America are divisible into eight well-marked genera, among which are comprised nearly all the more important ones, though some, such as *Eurinorhynchus* and *Limicola*, have no representatives. The most extensive of these, *Actodromas*, seems to contain two well-marked groups, at least sub-generically distinct. Each of the others comprises but a single admitted North American species; and of some, such as *Tringa*, *Arquatella*, and *Ancylocheilus*, but one species is at present known. The characters of the most importance among the *Tringeæ* seem to lie in the legs. The proportions of tibia, tarsus and middle toe, and their relations to the bill, readily characterize definitely the groups. They are also the most constant, being subject to very little variation in each species. This is as might be expected, from their radical nature, since the most important and essential character in any group should be the least subject to variation. The bill, on the other hand, differs much in length in the same genus or species; it reaches its maximum of variation in *Ereunetes*, and is most constant throughout the genus *Actodromas*. The wings and tail vary somewhat, but within very narrow limits.

The North American genera of *Tringeæ* may be readily characterized by the proportions of bill, tarsus and toe, without reference to the tail or wings, though these of course furnish additional characters. The following schedule, in which the characters are purposely made as brief as possible, will serve to define the genera as adopted.

Synopsis of Genera.

A. Toes with a decided basal web.

Bill equal to tarsus, both very long; exposed portion of tibia equal to middle toe, which is not quite two-thirds the tarsus, *Micropalama.*

Bill equal to tarsus, both moderate; tibia exposed for two-thirds the middle toe, which nearly equals the tarsus, *Ereunetes.*

B. Toes cleft to the base, or with a very rudimentary membrane.

I. Bill longer than the tarsus.

1. Bill straight; tibia moderately or scarcely at all exposed.

Tarsus longer than the middle toe, hind toe present, *Tringa.*
As in *Tringa;* hind toe absent, *Calidris.*
Tarsus shorter than the middle toe, *Arquatella.*

2. Bill decurved; tibia much exposed.
   Bill compressed; legs long, slender; middle toe not quite three-fourths the tarsus, *Ancylocheilus*.
   Bill depressed; legs moderate, stout; middle toe nearly or about equal to tarsus, *Pelidna*.

II. Bill equal to the tarsus.
   Tarsus equal to middle toe, *Actodromas*.

The most natural succession of the genera appears to be that presented above, viz.: *Micropalama*, *Ereunetes*, *Tringa*, *Calidris*, *Arquatella*, *Ancylocheilus*, *Pelidna*, *Actodromas*. *Micropalama*, in its long, slender, sensitive bill, somewhat furrowed culmen and digital web, seems to form the natural connecting link between *Scolopaceæ* and *Tringeæ*, through *Macroramphus*. *Ereunetes* is next most closely allied, having also the membrane to the toes; but here the bill and feet are shortened, and have nearly the proportions of *Tringa*, which most naturally succeeds. *Calidris* is in all essentials like *Tringa*, except the absence of the hind toe. In *Arquatella* the bill is sometimes very slightly decurved; in *Ancylocheilus* and *Pelidna* it is successively more so. In the latter the middle toe becomes nearly or quite equal to the tarsus, opening the way for *Actodromas*, where the slender, attenuated bill, and much denuded tarsus, seem to lead directly to the *Totaninæ*.

If so great a subdivision of the *Tringeæ* as is here presented be objected to, it is replied that the variations in external form are so great that a single genus, in the modern acceptation of the term, cannot contain them all; and if more than one genus be adopted for those with fully-cleft anterior toes, it is not easy to stop short of the number here adopted. Ornithologists have indeed perceived how unnatural was the association of all the species under *Tringa*, and at different times, some of them very early, names have been proposed for all the groups. As early as 1800, the absence of the hind toe caused *Calidris* to be separated; and, in 1811, the webbed feet of *Ereunetes* were made the grounds of generic distinction. *Pelidna* of Cuvier, instituted in 1817 for the slender-toed smaller Sandpipers, was a further attempt at division; but that genus, as left by its author, still contained species very dissimilar; and, in 1829, *Ancylocheilus* and *Actodromas* were characterized. The great peculiarities of *Tringa himantopus* Bon. caused it, soon after its first discovery, in 1828, to receive subgeneric distinction from *Tringa*. It was not, however, till 1858, that *Arquatella*, a peculiar form, was characterized. But while in other groups, particularly among the smaller land birds, the divisions have been minute and greatly extended, there seems to have been a general reluctance on the part of ornithologists with regard to recognizing these divisions. It may be that in this group Nature allows more external variation in forms very closely allied than is usual; but until this is proved to be the case, it seems necessary, to keep pace with the progress of ornithology, to consider the characters of the different sections as of full generic value.

Having, it is thought, dwelt sufficiently upon the general features of the group, we proceed at once to characterize the different genera and species.

MICROPALAMA Baird.

Hemipalama, Bonaparte, Syn. 1828, 316. Typus *Tringa himantopus*, Bon. nec Bon. Obs. Wils. 1825. (Typus *T. semipalmata*, Wils.)

Micropalama, Baird, Gen. Rep. 1858, 726. Typus *T. himantopus*, Bon.

Char. Bill long, equalling the tarsus, straight or very slightly decurved, slender, very much compressed, tip much expanded and vascular for some distance. Culmen on the terminal half depressed, with two rudimentary, longitudinal furrows. Groove on the lower mandible narrow and indistinct. Wings moderate, pointed, first primary a little the longest. Tail of twelve

feathers, short, nearly even or slightly doubly emarginate, the central feathers projecting but little. Legs very long; tarsus equal to the bill; exposed portion of tibia equal to middle toe, which is not quite two-thirds the tarsus. Toes with a decided basal membrane; flattened beneath, but only moderately margined. Hind toe well developed. Body slender; neck long.

A marked and very peculiar genus of Sandpipers, of which the most characteristic feature, in addition to the long compressed bill, is the remarkable elongation of the tibia and tarsus. The former is exposed for fully the length of the middle toe, and is bare for a tenth of an inch or more further. The tibial feathers are very short. The tarsus is nearly a third longer than the middle toe. The basal membrane of the toes, which, though much emarginated, is very considerable and decided, is greatest between the outer and middle toe, where it extends to the first joint. The wings and tail are moderate, and present no special peculiarities.

In the lengthened sensitive bill, basal membrane of the toes, and some other characters, *Micropalama* seems to have a close affinity to *Macroramphus*, and in a measure to connect by means of that genus *Scolopaceæ* and *Tringeæ*, possessing, nevertheless, all the distinguishing features of the latter section. Among the *Tringeæ* it comes nearest to *Ereunetes*, which has the basal web and the same relative free portion of bill and tarsus. The other characters, however, are widely different.

Hemipalama was proposed by Bonaparte in 1825 as a subgenus for the *Tringa semipalmata* of Wilson, but was subsequently used for the present bird. But as the generic characters are very different, the name cannot be used in this connection. *Micropalama* of Baird has as its type the *T. himantopus* of Bonaparte, and is the name which should be employed.

MICROPALAMA HIMANTOPUS, (Bon.), Baird.—Stilt Sandpiper.

Tringa himantopus, Bonaparte, Ann. N. Y. Lyc. ii. 1826, 157, [fide Gen. Rep.] Lesson, Manual Ornith. 1828, ii. 284. Swainson, F. B. A. 1831, ii. 380. Bonaparte, Am. Orn. 1833, iv. 89, tab. 25, fig. 3. Audubon, Orn. Biog. 1838, iv. 332, tab. 344; Id. Syn. 1839, 235; Id. Birds Amer. 1842, v. 271, tab. 334. Giraud, Birds L. I. 1844, 232.

Tringa Douglassii, Swainson, F. B. A. 1831, ii. 379, tab. 66.

Tringa (Hemipalama) Douglassii, Nuttall, Man. Orn. 1834, ii. 141, [cum fig.]

Tringa (Hemipalama) himantopus, Bonaparte, Spec. Comp. 1827, 61; id. Syn. 1828, 316. Nuttall, Man. Orn. 1834, ii. 138.

Tringa (Hemipalama) Audubonii, Nuttall, Man. Orn. 1834, ii. 140, [juv.]

Hemipalama himantopus, Bonaparte, Comp. List. 1838, 49. Dekay, N. Y. F. 1844, 235, tab. 86, fig. 196.

Hemipalama multistriata, "Licht." Gray, Genera, 1849, iii. 578.

Totanus himantopus, Lambeye, Av. Cubae, 1850, 95.

Micropalama himantopus, Baird, Gen. Rep. 1858, 726.

Sp. Char. Bill much longer than the head, very slightly decurved, much compressed; the tip flattened, expanded, punctulate. Wings moderate or rather long, first primary longest, the rest successively more rapidly graduated. Tail rather short, slightly doubly emarginate, the central feathers projecting but little. Legs very long; exposed portion of tibia equal to middle toe, which is two-thirds the tarsus. *Adult in spring.*—Upper parts very dark brownish black, deepest on the scapulars, each feather edged and tipped with white, light yellowish or reddish, which on the scapulars makes two or three deep indentations. A dusky line from bill to eye, and a light one over the latter to the occiput. Auriculars, and a continuous line beneath and in front of the eye, light chestnut red. A broad stripe of bright chestnut on each side of the occiput, confluent on the nape. Rump dusky; upper tail coverts white, transversely barred with wavy lines of deep dusky. Primaries deep dusky, the tips blackish. Tail ashy grey, central feathers scarcely darker, the mar-

gins of all and a central field along the shaft white. Under parts white, the throat and jugulum streaked, and the other parts thickly and uniformly waved with transverse dusky bars, bordered with light reddish. Bill, legs and feet, dark greenish black. *Young.* Upper parts a uniform light greyish ash, the blackish feathers appearing at intervals; these and the dusky scapulars and wing coverts bordered with white. Upper tail coverts white, scarcely marked with dusky. Primaries as in the adult. Under parts white, the jugulum with an ashy suffusion, and obsoletely streaked. Slight traces of the reddish auriculars. Bill dusky black, legs and feet light greenish yellow.

Length 9·25, extent 16·75, wing 5·1, tail 2·3. Tarsus 1·6, middle toe 1, tibia exposed 1 inch.

Habitat.—North America, east of the Rocky Mountains.

The preceding diagnosis would characterize the species sufficiently well for ordinary purposes; but in view of the uncertainty whether there are not two or more species to be enumerated as inhabitants of North America, a somewhat more extended description may not be considered unnecessary. The following is taken from a very perfect male from Great Slave Lake in spring plumage; and the description of the supposed young is from a specimen from the Red Fork of the Arkansas.

The feathers extend on the lower mandible nearly in the form of a right angle, their upper outline being about parallel with the culmen, to a distance beyond those on the upper equal to half the distance of those between the rami. The crown of the head is blackish, streaked with white and with reddish. An ill-defined light line over the eye commences about half way between the eye and bill, and extends to the occiput, widening posteriorly. There is a dusky line between the eye and bill. The auriculars are light chestnut red, which color extends as a line beneath and before the eye to the white stripe above; interrupted by this, it commences above the stripe and passes over the side of the occiput to the nape, where it is confluent with the one on the opposite side. The hind neck is simply streaked with dusky and whitish. The middle of the back is black, each feather edged and tipped with light yellowish, which encroaches upon the central black in two or three irregular indentations. On the scapulars the edgings are tinged with reddish, and the indentations are more numerous and regular. The long tertials are blackish, evenly edged with chestnut passing into whitish at the tip. All the feathers of the back have a greenish gloss. The secondaries and greater coverts are light ashy edged with white, the lesser coverts darker with light borders. The primaries are dusky, their tips black, the shaft of the first brown passing into white, of the others black passing into brown; the tips of all black. The centre of the rump is dusky, the sides nearly white; the upper tail coverts white with numerous sagittate or wavy bars of deep dusky. The tail is very light ash, the central feathers scarcely darker, all with the margins and a central shaft field white, most of the inner vane of the two outer being white. The under parts are white; the throat very sparsely marked with minute dusky streaks, which on the jugulum are much larger and more numerous; these streaks on the breast change to transverse wavy bars of dusky bordered with reddish, which uniformly cover the whole under parts. These lines are thickest and most distinct on the breast, growing more obsolete in the middle of the belly, and are largest on the sides under the wings, where the reddish margins fill up the space between the bars on the same feather. There is little reddish on the under tail coverts, where the bars become more or less sagittate.

The young is very different from the adult in color, but presents much the same form and size. The upper parts are of a uniform light ashy, the blackish of the adult appearing in irregular patches. These dark feathers, as well as the scapulars, wing coverts and tertials are edged with white, the latter

slightly tinged with reddish. The wings and tail are much as in the adult, the upper tail coverts, however, scarcely barred. The under parts are white; the jugulum, and, to some extent, the sides under the wings with a lighter wash of the color of the back, and with very obsolete streaks of dusky. The under tail coverts laterally are slightly streaked with dusky. There is an indistinct white line over the eye, and a dusky one between the eye and bill. The auriculars show traces of the reddish, but there is none to be perceived on the nape or sides of the occiput. The bill is black, as in the adult, but the legs are very different, being light greenish yellow.

The synonymy of this Sandpiper, in consequence of its very remarkable form and colors, is definite and well determined, though, as will be seen by the list given, various names have been applied to it by different authors. It was first introduced to the scientific world in 1826, by Bonaparte, in the Annals of the N. Y. Lyceum, under the name of *Tringa himantopus*. By the same author it was afterwards placed in his subgenus *Hemipalama*, (subsequently erected into a genus.) The type of this, however, being, as already stated, the *T. semipalmata* of Wilson, the name cannot of course be retained. Nearly all authors who speak of it employ *Hemipalama*, giving it either subgeneric or full generic rank. Lambeye, however, places the bird in *Totanus*, probably with reference to the long legs and the webbing of the toes. *Tringa Douglassii* of Swainson, is undoubtedly the present bird in mature plumage, though the figure indicates a more rufescent state of plumage than I have ever seen. The *Tringa himantopus* "Bon." of the same author, Nuttall, (page 40 of the Manual,) very precipitately "ventures to consider as a distinct species from the preceding" (*T. himantopus*,) and names it *Tringa* (*Hemipalama*) *Audubonii*, though retaining both the *T. himantopus* Bon. and *Douglassii* Sw. I have little doubt, however, that all three names refer to the same bird, the *Micropalama himantopus* of Baird (General Report, page 726) and of the present article.

EREUNETES Illiger.

Ereunetes, Illiger, Prod. 1811, 262; typus *E. petrificatus*, Ill.

Hemipalama, Bonaparte, Obs. Wils. 1825, 88. Typus *T. semipalmata*, Wils. Nec syn. 1828.

Heteropoda, Nuttall, Man. Orn. 1834, ii. 136. Typus idem. Nec Latreillei, 1804, fide Gen. Rep.

Char. Bill variable, about as long as the head, straight, quite stout, both mandibles deeply grooved to the considerably expanded, sensitive, vascular tip. Wings long, pointed; secondaries deeply obliquely incised; tertials narrow and elongated. Tail moderate, doubly emarginate, the central feathers pointed and projecting. Tarsus rather longer than middle toe, usually about equal to the bill. Bare portion of tibia two-thirds the tarsus. Toes connected by a broad basal web, and broadly margined. Hind toe well developed.

A genus well characterized among the *Tringeæ* by the extensive webbing of the toes, a feature by which it may be readily distinguished from all other genera, except *Micropalama*. The other differences, however, from that genus are very great. The bill is much shorter, being about equal to the head, instead of very much longer. The middle toe is nearly equal to the tarsus, and the bare portion of the tibia is much less. The colors are very different. On the other hand *Ereunetes* comes very near to *Tringa*, with which it agrees in almost every particular, except that of the semipalmation of the toes. It appears to form the natural link between *Micropalama* and *Tringa* proper.

According to Cassin, (Gen. Rep. 724,) the genus *Ereunetes* of Illiger, is based upon a bird which has been proved, by actual examination of the type specimen, to be the *Tringa semipalmata*, Wils. *Ereunetes* must therefore supersede *Hemipalama*, Bon., and *Heteropoda*, Nutt., both instituted upon the same type.

EREUNETES PUSILLUS, (L.) Cassin.—Semipalmated Sandpiper.

Tringa cinclus, Dominicensis minor, Brisson, Ornith. 1760, v. tab. 37, fig. 3, [haud dubiè.]

Tringa pusilla, Linnæus, Syst. Nat. 1766, i. 252, [in præcedentem instituta.] [Nec Meyer. ; nec Bechst. ; nec Wils.] Gmelin, Syst. Nat. 1788, i. 681. Latham. Ind. Orn. 1790, ii. 737.

? Tringa pusilla, Vieillot, Nouv. Dict. 1819, xxxiv. 452.

Ereunetes petrificatus, Illiger, Prod. 1811, 262. Cassin, Gen. Rep. 1858, 724.

Tringa semipalmata, Wilson, Am. Orn. 1813, vii. 131, tab. lxiii. fig. 3 ; id. Ord. Ed. 1829, iii. 132 ; id. Brewer. Ed. 1840, 542, fig. 225 ; ib. Syn. 725. Vieillot, Nouv. Dict. 1819, xxxiv. 462. Swainson, F. B. A. 1831, ii. 381. Audubon, Orn. Biog. v. 1839, 111, tab. 408 ; id. Syn. 1839, 236 ; id. Birds. Amer. 1842, v. 277, tab. 336. Giraud, Birds L. I. 1844, 239. Newberry, P. R. R. Surv. 1857. vi. 100.

Tringa (Hemipalama) semipalmata, Bonaparte, Obs. Wils. 1825, num. 212 ; id. Specc. Comp. 1827, 62.

Hemipalama semipalmata, Lambeye, Av. Cubæ, 1850, 96.

Tringa (Heteropoda) semipalmata, Nuttall, Man. 1834, ii. 136.

Heteropoda semipalmata, Bonaparte, Comp. List, 1838, 49. Dekay, N. Y. Fauna, 1844, 236, tab. 86, fig. 195. Gray, Genera, 1849, iii. 580.

Ereunetes semipalmatus, Cabanis, Schom. Reise. iii. 758, fide Gen. Rep. Bonaparte, Comptes Rend. xliii. 1856, fide Gen. Rep. Cabanis, Journ. fur Orn. 1856, 419, fide Gen. Rep.

? Heteropoda mauri, Bonaparte, Comp. List, 1838, 49, fide Gen. Rep.

? Ereunetes mauri, Gundlach, Cab. Journ. 1856, 419, fide Gen. Rep.

? Hemipalama minor. Lambeye, Av. Cubæ, 1850, 97.

Tringa brevirostris, Spix, Av. Bras. 1825, ii. 76, fide Gen. Rep.

? Pelidna Brissoni, Lesson, Man. d'Orn. 1828, ii. 277, [*T. pusillam*, Linn. citat.]

Ereunetes pusillus, Cassin, Proc. Acad. N. S. 1860, xiii. 195.

Sp. char. Bill stout, straight, variable in length, usually about equal to the head, the tip considerably expanded and punctulate. Feathers extending on the base of the bill to a nearly equal distance on both mandibles, their outline straight and vertical ; those between the rami reaching but little further. First primary usually longer than the second, the rest equally graduated. Upper tail coverts very long ; tail moderate, doubly emarginate, central feathers pointed and projecting. *Adult.*—Upper parts variegated with ashy, pure black, bright chestnut and white, each feather having a terminal black field, and being margined with reddish and tipped with white or ashy. Tertials dusky brown, edged with ashy or light chestnut ; wing coverts and secondaries dusky ash edged with ashy white. Primaries deep dusky ; shaft of the first white, the central portions of the others the same, their bases brown and tips black. Rump and upper tail coverts brownish black, the outer pair of the latter white barred with dusky. Central tail feathers dusky brown, the others light greyish ash scarcely edged with white. Beneath white ; the throat and breast slightly rufescent, and with oval or cordate spots of brownish black, most numerous across the breast, and extending sparsely along the sides as shaft lines. Middle of belly and under tail coverts white, mostly immaculate. Bill and feet greenish black.

Length 6·5, wing 3·75, tail 2·1 ; bill (average) 1 inch ; tarsus ·85, toe ·8, tibia, bare, ·50.

Habitat.—Entire temperate North America. Bahaia Islands.

The present bird, the single admitted* American representative of a genus

* I am by no means satisfied that but a single species of *Ereunetes* exists in North America. The differences in size, in length and proportions of the tarsus even, and especially in the bill, cause it to seem almost impossible that all the specimens before me are specifically the same. Thus, the difference in the length of the tarsus, between the

of such peculiar characters, requires comparison with no other sandpiper. *Actodromas minutilla* has much the same pattern of coloration, and sometimes approaches it in size ; but the other differences are too great to allow of their being confounded.

The bill of this species varies most remarkably in length, the difference being *four-tenths* of an inch ; it is always, however, quite stout. The tibia and tarsus vary somewhat, but within narrow limits. The proportions of the quills vary, but the first is usually longest. The tail is very decidedly doubly emarginate, the difference between the outer and next feather being nearly one-tenth of an inch ; the third is the shortest. The upper tail coverts are very long, as are also the tertials. The winter and immature plumage shows little or none of the reddish, the feathers being mostly ashy with lighter borders. The young in July and August have scarcely any traces of the spots beneath, being almost entirely white, with a light buff wash across the breast. There is also much more white on the margins of the feathers of the upper parts.

With the exception of *Tringa canutus* and *Ancylocheilus subarquata*, there is perhaps no North American Sandpiper which has received such a variety of names as the present. Fortunately, however, the proper name to be employed is now pretty definitely determined. The subject of the generic appellation has already been discussed under *Ereunetes*, and it now only remains to settle the question of the specific denomination. The first notice of the species is in 1760, by Brisson, who, in his *Ornithologia*, describes and figures a *Tringa cinclus Dominicensis minor*, which can be no other than the present bird. The description applies well, and the figure plainly shows the webbing of the toes, a feature entirely peculiar among the smaller *Tringeæ*. It was upon this bird that Linnæus, in 1766, based his *Tringa pusilla*, which name being the first applied to the bird in the binomial system, has priority over all others, and must be employed. In 1811, at the time of the founding of the genus *Ereunetes*, of Illiger, that author named the bird *E. petrificatus*. Cassin, in the General Report, though admitting that *T. pusilla*, Linn., is really this species, does not change Illiger's specific appellation, concerning which all doubt is removed by the actual examination of the type specimen. Very recently, however, in the Proceedings of the Philadelphia Academy, he has given the bird as *Ereunetes pusillus*, Cass., the name by which it should be known. In 1813 Wilson named the bird *T. semipalmata*, which designation being a most appropriate one, has been in general use among modern ornithologists, though referred by different authors successively to *Tringa*, *Heteropoda* and *Ereunetes*. The *Pelidna Brissoni*, of Lesson, who quotes *T. pusilla*, Linn., is probably the present bird.

The remarkable variations in size and in the depth of the bill to which this bird is subject, have given rise to several nominal species. The *Hemipalama*

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largest and smallest of these, amounts to nearly two-tenths of an inch ; and in length of bill to about *four-tenths*, the latter being more than half the entire length of the shorter bill. The shortest bills appear fully as stout as the longest. These differences do not seem to depend upon locality, being found in specimens from the same region, while specimens from widely separated localities are absolutely identical. Thus, an excessively short-billed bird from Maryland is identical with one from Nebraska, while very large and long-billed specimens from Georgia, Utah and the Pacific coast do not differ appreciably. Specimens, however, from the same locality, and undoubtedly of the same species, exhibit much variation in size, length of bill and tarsus, amount of red or white above, and character of the spots beneath ; so that without a full series of the common Atlantic bird before me, and especially in the uncertainty, if two or more species be admitted, to which one the name *pusilla* belongs, I have preferred to consider them as specifically identical. Still, it would not be surprising if a careful and extended examination of a large series of *Ereunetes* from all localities on the continent should substantiate two or even three good species : *Tringa semipalmata*, of Wilson, *Hemipalama minor*, of Gundlach, and *Heteropoda mauri*, of Bonaparte.

minor of Gundlach is founded upon shortness of bill as a character; as is also (fide Gen. Rep.) the *Tringa brevirostris* of Spix. By the same authority the *Heteropoda mauri* of Bonaparte is considered as merely a larger race of the present species.

TRINGA Linnæus.

Tringa, Linnæus, Syst. Nat. 1735. Tyups *T. canutus*, L. (fide G. R. Gray.)
Calidris, Cuvier, Regne An. 1817, Typus *T. canutus*, L. (Nec. Cuv. 1800, cujus typus *T. arenaria*, i. fide G. R. Gray.)
Canutus, Brehm, 1830, (fide G. R. Gray.)

Char.—Bill about as long as, or rather longer than, the head, straight, stout, somewhat compressed, widening uniformly from the middle to the slightly expanded, rather hard tip; the culmen depressed on the terminal half to the expansion at tip, and obsoletely furrowed. Both mandibles deeply grooved to the tip. Nostrils very large and placed far forward in the upper groove. Feathers extending on the lower mandible much further than on the upper, and nearly as far as those between the rami. Wings long, pointed, first primary decidedly longest. Secondaries moderately incised. Tertials short, broad, and comparatively stiff. Tail rather short, nearly even, the central feathers projecting but little if any. Legs short and very stout; tarsus usually shorter than the bill; longer than the middle toe. Tibial feathers reaching nearly to joint; tibiæ bare for nearly two-thirds the tarsus. Toes very short and stout, free at base, widely margined; outer lateral longer than inner. Hind toe present, well developed. Claws short, stout, blunt, much curved, dilated on the inner edge. Size large, general form stout.

In the above diagnosis I have drawn the characters of the genus so as to include only the type (*canutus*) upon which it was founded. In this acceptation it may be considered as typical of the section, embodying as it does the most characteristic features of the group, and presenting their usual variations; very great in plumage and in the length of the bill, and slight in the proportions of the legs and shape of the wings and tail. The essential characters lie in the stout, moderately long, straight bill, which usually considerably exceeds the tarsus, which latter is much longer than the very short stout toes; the long tibial feathers, long pointed wings, and short nearly even tail. The peculiar proportions of bill and legs is shared by no other Sandpiper, so far as my knowledge extends, except *Calidris*, which is evidently closely allied. This genus, however, is at once distinguished by the marked character of the absence of the hind toe. The affinities of *Ereunetes* have already been adverted to. *Arquatella* presents the next closest relationship, but is well characterized by the extremely abbreviated tarsus, rounded tail, and some other features.

Tringa is among the oldest of genera, having been established by Linnæus in 1735. As usual with old Linnæan genera, it has been used with great latitude, all the species which now compose the section having been included in it. It seems, however, to represent a form from which all others are sufficiently different to require full generic rank. Its synonyms are (fide G. R. Gray) *Calidris* of Cuvier, 1800, (not of 1817, of which the type is *T. arenaria*, L.,) and *Canutus* of Brehm, 1830.

North America possesses but a single representative of the genus as restricted. The *Tringa Cooperi* of Baird, which has been referred to it, seems to fall more naturally under *Actodromas*. Its relationships will be found fully discussed under that head.

TRINGA CANUTUS Linnæus.—Red-breasted Sandpiper.

Tringa canutus, Linnæus, Syst. Nat. i. 1766, 251. Latham, Ind. Orn. 1790, ii. 738. Pennant, Arct. Zool. 1785, ii. 473. Gmelin, Syst. Nat. 1788. Pallas, Zoog. Rosso-As. 1811, ii. 197. Temminck, Man. d'Orn. 1820, ii. 627.

Jenyns, Manual, 1835, 213. Bonaparte, Comp. List, 1838, 49. Schinz. Europ. Faun. 1840, i. 326. Macgillivray, Man. Brit. Orn. 1842, ii. 67, Dekay, N. Y. F. 1844, 243, tab. 85, fig. 194, et tab. 97, fig. 218. Schlegel, Rev. Crit. 1844, 88. Gray, Genera, 1849, iii. 579. Degland, Orn. Eur. 1849, ii. 219. Bonaparte, Rev. Crit. 1850, 185. Parzudaki, Cat. Ois. Eur. 1859, 14. Meyer, Brit. Birds, 1857, v. 67. Cassin, Gen. Rep. 1858, 715.

Tringa ferruginea, Brunnich, Orn. Bor. 1764, 53. Vieillot, Nouv. Dict. 1819, xxxiv. 466.

Tringa cinerea, Brunnich, Orn. Bor. 1764, 53. Latham, Ind. Orn. 1790, ii. 733. Pennant, Arct. Zool. 1785, 474. Gmelin, Syst. Nat. 1788, i. pars ii. 673. Wilson, Am. Orn. 1813, vii. 36, tab. lvii. fig. 2; id. Ord. Ed. 1829, iii. 142; id. Brewer. Ed. 1840, 482, fig. 224; ibid. Syn. 725. Lichtenstein, Verz. 1823, 72. Lesson, Man. d'Orn. 1828, ii. 283. Swainson, F. B. A. 1831, ii. 387. Nuttall, Man. Orn. 1834, ii. 125.

?Tringa australis, Gmelin, Syst. Nat. 1788, i. pars ii. 679. Latham, Ind. Orn 1790, ii. 737.

Tringa nævia, Gmelin, Syst. Nat. 1788, i. pars ii. 681. Latham, Ind. Orn. 1790, ii. 732. Pennant, Arct. Zool. 1785, ii. 480.

Tringa grisea, Gmelin, Syst. Nat. 1788, i. pars. ii. 681. Latham, Ind. Orn. 1790, ii. 733.

Tringa islandica, Gmelin, Syst. Nat. 1788, i. pars. ii. 682. Latham, Ind. Orn. 1790, ii. 737. Pennant, Arct. Zool. 1785, ii. 476. Audubon, Orn. Biog. 1838, iv. 130, tab. 315; id. Syn. 1839, 232; id. Birds Amer. 1842, v. 254, tab. 328. Giraud, Birds L. I. 1844, 224. Holboll, Fauna Grœn. 1846, 38. Nilsson, Scand. Faun. 1858, ii. 252.

Tringa rufa, Wilson, Am. Orn. 1813, vii. 43, tab. lvii. fig. 5; id. Ord. Ed. 1829, iii. 140; id. Brew. Ed. 1840, 487, fig. 227; ibid. Syn. 725.

Tringa (*Tringa*) *canutus*, Bonaparte, Cat. Met. 1842, 61.

Tringa (*Tringa*) *islandica*, Bonaparte, Speech. Comp. 1827, 62.

Tringa (*Tringa*) *rufa*, Bonaparte, Obs. Wils. 1825, 93.

Sp. Char.—Largest of North American *Tringeæ*. Bill stout, straight, rather longer than the head, upper mandible widely and deeply grooved to the expansion at tip. Feathers extending on lower mandible much farther than on upper, and nearly as far as those between the rami. First primary decidedly longest; tail short, nearly even; legs short, stout; tarsus usually shorter than the bill, but much exceeding the middle toe. *Adult in spring.* Upper parts brownish-black, each feather broadly tipped and edged with ashy white, tinged with reddish yellow on the scapulars. Rump dark ash, transversely banded with dusky; upper tail coverts white, with transverse sagittate or crescentic bars of brownish-black. Tail greyish ash, edged with ashy white. Outer webs and tips of primaries deep dusky, the inner much lighter. Secondaries and coverts greyish ash, broadly edged and tipped with ashy white. Line over the eye and entire under parts a uniform deep brownish-red, fading into white on the sides posteriorly and the under tail coverts, which latter are marked with sagittate spots of dusky. Legs and feet greenish black. *Young in autumn.* Upper parts a uniform dark ash, or cinereous, each feather tipped with ashy or pure white, and having a sub-terminal edging of dusky black. Indistinct line over the eye, and whole under parts white, more or less tinged with light reddish, and the throat, breast and sides with rather sparse, irregularly disposed lines and spots of dusky, which become transverse waved bars on the latter.

Length 10·5, extent 20·5, wing 6·4, tail 2·7. Bill about 1·4, tarsus 1·2, middle toe 1 inch. Tibia bare ·6.

Habitat.—Atlantic coast of North America; Europe.

This is the largest of the Sandpipers, and, though exceeding all others in the variation of plumage to which it is subject, may yet be easily recognized in all stages by its generic characters, which differ in some marked particulars from those of any other bird of the section. In the above diagnosis are given the

plumage of the adult and of the young of the first autumn. These represent the two extremes; but birds may be found of every intermediate stage. In respect to form, the bird varies chiefly in the length of the bill and shape of the tail. The bill in adult specimens is always longer than the tarsus, but being dependent somewhat on age, may in young birds be found equal to the tarsus, or even a little shorter. The tail, usually nearly or quite even, is sometimes in immature birds considerably doubly emarginate; the central feathers, however, are never pointed and projecting as in *Actodromas*. As usual among the *Tringeæ*, the tarsus and toes do not differ much in length or proportions.

Tringa canutus is mentioned in the very earliest ornithological writings, and, as is usually the case with those species which vary much in plumage, has received a great variety of names. The older authors instituted nominal species on almost every change of plumage which it undergoes; but still, these stages are now so well known, that there is little difficulty in identifying the descriptions. The "grisled" and "freckled" sandpipers of Latham and Gmelin, *T. grisea* and *nævia*, as well as, in all probability, the *T. australis*, Gm., are to be referred to intermediate stages of the present bird. But it is the plumage of the first autumn which has given rise to the most firmly established nominal species, the *T. cinerea*, Auct.; it is as different as possible from that of the adult, and at the same time is marked in character and presents but few evidences of immaturity. It is not a little singular that as late as 1813 Wilson should give the bird a new name, (*T. rufa*,) and say that "of this prettily-marked species I can find no description;" there being already at that date no less than *seven* different appellations for the bird. *Tringa canutus* of Linnæus seems to have priority over all others, and is the name now in general use.

CALIDRIS Cuvier.

Calidris, Cuvier, 1799—1800, (fide G. R. Gray;) 1805, (fide Gen. Rep.) Nec *Calidris*, Cuv. Regn. An. 1817.

Arenaria, Meyer, 1810, (fide G. R. Gray.) Nec Linnæi.

Char.—Bill stout, straight, about equal to the head or tarsus; tip thickened, expanded and rather hard, the culmen just posterior to it somewhat depressed and hollowed. Nostrils situated far forward. Wings long, pointed; tail short, doubly emarginate, central feathers projecting. Tibia bare for two-thirds the length of the tarsus; toes very short and widely margined. Hind toe wanting. (General characters of *Tringa* proper, but without hind toe.)

A genus well marked by the absence of the hind toe, a feature entirely peculiar among *Tringeæ*. In other respects it comes nearest to *Tringa* proper, with which it has a very close affinity, the bill, tarsus and toes, as well as the tibia, having much the same proportions. The toes, however, are even shorter, and the tail is doubly emarginate, a feature scarcely seen in *Tringa*. The bill in its short and stout proportions has much the general appearance of that of *Charadrius*; which fact, in connection with absence of the hind toe, has caused the single species of the genus to be referred to the plovers by some of the older authors. In all other respects, however, as well as in general habits, the bird is a true Sandpiper.

According to Gray, *Calidris* of Cuvier, of 1799—1800, is founded upon the *T. arenaria*, L. The name must therefore be employed in the present connection, though in 1817 Cuvier gives *T. canutus*, L. as the type of the genus. *Arenaria* of Meyer, of 1810, based, according to Gray, upon the *T. arenaria*, is preoccupied in Botany, that being the name of an old Linnæan genus of plants.

Calidris arenaria Illiger.—Sauderling.

Tringa arenaria, Linnæus, Syst. Nat. 1766, i. 251. Audubon, Orn. Biog. 1839, iii. 231, v. 582; id. Syn. 1839, 237; id. Birds Amer. 1842, v. 287, tab. 338. Schlegel, Rev. Crit. 1846, 90.

Trynga tridactyla, Pallas, Zoog. Rosso-As. 1811, ii. 198.
Charadrius calidris, Linnæus, Syst. Nat. 1766, i. 255. Wilson, Am. Orn. 1813, vii. 68, tab. lix. fig. 4; id. Ord. Ed. 1829, iii. 167; id. Brew. Ed. 1840, 503.
Charadrius rubidus, Gmelin, Syst. Nat. 1788, i. 688. Wilson, Am. Orn. 1813, vii. 129, tab. lxiii. fig. 3; id. Ord. Ed. 1829, iii. 170; id. Brewer. Ed. 1840, 541.
Arenaria vulgaris, Leisler, (fide G. R. Gray.)
Arenaria calidris, Meyer, (fide G. R. Gray.) Degland, Ornith. Europ. 1849, ii. 240. Lambeye, Av. Cubal. 1850, 100.
Calidris arenaria, Illiger, Prod. 1811, 249. Temminck, Manual, ii. 524. Lichtenstein, Verz. 1823, 72. Bonaparte, Obs. Wilson, 1825, v. 105. Swainson, F. B. A. 1831, ii. 366. Nuttall, Manual, 1834, 4. Jenyns, Manual, 1835, 183. Schinz. Eur. Faun. 1840, i. 298. Bonaparte, Comp. List. 1838, 50; id. Catal. Metod. 1842, 61. Macgillivray, Man. Brit. Orn. 1842, 65. Giraud, Birds L. I. 1844, 243. Gray, Genera, 1849. iii. 581. Bonaparte, Revue Crit. 1850, 184. Cassin, U. S. Ast. Exp. 1855, ii. 194; id. Gen. Rep. 1858, 723. Nilsson, Scand. Faun. 1858, ii. 255. Cooper et Suckley, Nat. Hist. Wash. Terr. 1860, 241.
Calidris tringoides, Vieillot, Gal. Ois. 1834, ii. 95, tab. ccxxxiv.
Calidris Americana, Brehm, Vog. Deut. 1831, 675, (fide Gen. Rep.)

Sp. Char.—Bill short, stout, straight, the tip much thickened and expanded. Upper mandible widely, lower narrowly but distinctly, grooved. First primary decidedly longest. Tail doubly emarginate, the central feathers pointed and much projecting. Legs moderate, toes very short and widely margined. *Adult in spring.* Entire upper parts and neck all round, variegated with black, light ashy and bright reddish; on the back and scapulars each feather having a central black field, and being broadly margined and tipped with ashy or reddish. Under parts white, immaculate. Outer webs and tips of primaries deep brownish black, inner light ashy. A white spot at base of inner primaries. Secondaries mostly pure white; the outer vanes and part of inner on the latter half dusky. Greater coverts dusky, broadly tipped and narrowly edged with pure white. Rump, upper tail coverts and central tail feathers dusky, tipped and narrowly edged with ashy white; lateral tail feathers very light ash, nearly white. Legs and feet black. *Young in autumn.* No traces of the reddish. Upper parts very light ash, each feather fading into white on the edges, and with a narrow shaft line of dusky. Entire under parts pure white. Scapulars dusky, edged with whitish. Other parts as in the adult.

Length 7·5 to 8, extent 15 to 16; wing 4·9, tail 2·25. Bill about 1 inch, tarsus rather less; middle toe ·75.

Habitat.—Temperate North America; South America; Europe.

In the above diagnosis I have given the breeding plumage and that of the young the first autumn; but a more usual winter dress differs from either. There are traces of the reddish on the upper parts generally and on the breast. Each feather above is brownish-black, regularly indented and tipped with ashy white, thus giving to the upper parts the appearance of being evenly mottled. There is a buff tinge on the breast, and also on the tips of the rump feathers. The bend of the wing is nearly as dark as in the adult. At all times the under parts of the bird from the jugulum are pure white.

As stated in the remarks upon the genus, the peculiarities of the form of this bird have caused it to be considered as a *Charadrius* by some of the older authors. Linnæus erred so much as to refer it to that genus in one state of plumage, and to classify it as a Sandpiper in another. Wilson, though retaining the species in *Charadrius*, remarks upon its evident affinity to the latter group. The *Charadrius rubidus* of Gmelin and Wilson represents the adult-breeding plumage, and the *C. calidris* of the same authors, the young bird. But the peculiarities of the bird are so great that it was very early removed from

both *Tringa* and *Charadrius*, and a genus *Calidris* formed for its reception. In 1811. Illiger called the bird *C. arenaria*, which is the name generally employed by ornithologists since that date. Audubon, however, in all his works retains the species in *Tringa*. I have found but two instances of the use of *Arenaria calidris*, Mey., which are those given in the list of synonyms. *Calidris tringoides* of Vieillot is undoubtedly the present bird, as is also (fide Gen. Rep) the *C. Americana* of Brehm.

ARQUATELLA Baird.

Arquatella, Baird, Gen. Rep. 1858, 714. Typus *Tringa maritima*, Brünn.

Char.—Bill variable, always longer than the head, straight or slightly decurved, very slender, much compressed, tip scarcely expanded. Groove in lower mandible shallow, sometimes nearly obsolete. Wings long, pointed. Tail moderate, cuneiform. Tibial feathers very long, covering the joint. Tarsus extremely abbreviated, much shorter than the bill or middle toe. Toes very long, broadly margined and flattened beneath. Hind toe very short; claws short and blunt.

In the remarkably abbreviated tarsus, much surpassed by the long toes,—in the lengthened tibial feathers, cuneiform tail and slender compressed bill,—*Arquatella* constitutes perhaps the most marked section of the *Tringeæ*, and one well worthy of full generic rank. Indeed it is a little remarkable that it was not earlier separated from the other allied genera. By most authors it has been considered as a true *Tringa*, and placed in close connection with *T. canutus*. Bonaparte, however, gives it as a *Pelidna*, though Cuvier, in establishing that genus, retains it in his *Calidris*, (of 1817 = *Tringa* proper.) Besides its striking peculiarities of form, the colors of the single species is very different from that of any other known Sandpiper. The name *Arquatella* is Pallas's specific appellation of the bird.

ARQUATELLA MARITIMA (Brünn.) Baird.—Purple Sandpiper.

Tringa maritima, Brünnich, Orn. Bor. 1764, 54. Gmelin, Syst. Nat. 1788, i. pars ii. 678. Latham, Ind. Orn. 1796, ii. 731. Pennant, Arct. Zool. 1785, 481. Vieillot, Nouv. Dict. 1819, xxxiv. 471. Temminck, Manual, 1820, ii. 619. Lesson, Manual, 1828, ii. 283. Swainson, F. B. A. 1831, ii. 382. Nuttall, Manual, 1834, ii. 115. Jenyns, Manual, 1835, 211. Audubon, Orn. Biog. 1835, iii. 558, tab. 284; id. Syn. 1839, 233; id. Birds Am. 1842, v. 261, tab. 330. Macgillivray, Man. Brit. Birds, 1842, ii. 67. Schinz, Eur. Faun. 1840, i. 324. Schlegel, Rev. Crit. 1844, 88. Giraud, Birds L. I. 1844, 236. Dekay, N. Y. Fauna, 1844, ii. 237, tab. 87, fig. 98. Hollbol, Fauna Grœn. 1846, 39. Degland, Orn. Eur. 1849, ii. 222. Gray, Genera, 1849, iii. 579. Parzudaki, Cat. Ois. Eur. 1856, 14. Meyer, Brit. Birds. v. 1857, 80. Nilsson, Scand. Faun. 1858, ii. 235.

Pelidna maritima, Bonaparte, Comp. List, 1838, 49; id. Rev. Crit. 1850, 185; id. Cat. Met. 1842, 60.

?Tringa striata, Linnæus, Syst. Nat. 1766, i. 248. Latham, Ind. Orn. 1790, ii. 733. Pennant, Arct. Zool. 1785, ii. 472. Gmelin, Syst. Nat. 1788, i. pars ii. 672.

Tringa unduta, Brünnich, Orn. Bor. 1764, 55. Latham, Ind. Orn. 1790, ii. 732. Gmelin, Syst. Nat. 1788, i. pars ii. 678. Vieillot, Nouv. Dict. 1819, xxxiv. 470.

Tringa nigricans, Montagu, Linn. Trans. 1796, iv. 40, (fide Gen. Rep.)

Trynga arquatella, Pallas, Zoog. Rosso-As. 1811, ii. 190.

Tringa canadensis, Vieillot, Nouv. Dict. 1719, xxxiv. 453.

Tringa (Arquatella) maritima, Cassin, Gen. Rep. 1858, 717.

Sp. Char.—Form and proportions typical of the genus. *Adult.* Entire upper parts a lustrous very dark bluish or blackish ash, with purple and violet

reflections, and each feather with a lighter border. Greater and lesser wing coverts, tertials and scapulars edged and tipped with white. Secondaries mostly white. Primaries deep dusky, the shafts dull white except at tip, where they are black. Upper tail coverts and central tail feathers brownish black with purplish reflections, the outer pair of the former white barred with dusky. Lateral tail feathers light ashy. Jugulum and breast bluish ash, each feather of the latter edged with white, and the ash extending along the sides beneath the wings. Rest of under parts white, immaculate. Legs, feet and bill at base light flesh-color; rest of bill greenish black. *Young in September.* Upper parts much the color of the adult, but with each feather broadly edged and tipped with light buff or reddish yellow. Light edging of wing coverts ashy instead of pure white. Under parts everywhere thickly mottled with ashy and dusky, deepest on the breast and jugulum.

Length 8 to 9, extent 15 to 16, wing about 5, tail 2·6. Bill above (average) 1·2; tarsus ·9; middle toe 1·1; tibia bare ·45.

Habitat.—Atlantic coast from Greenland to Florida. Europe.

Except in the very immature plumage given above, this Sandpiper varies but little in color, the difference between adult and young being chiefly in the depth and intensity of the tints. As the bird advances toward maturity, the upper parts become darker and more lustrous, the edgings of the wing coverts and scapulars more conspicuous and better defined. The mottling of the under parts is gradually restricted till it forms the well defined, uniform dark ash of the jugulum and breast, the sides being always sparsely streaked, and the rest of the under parts white, immaculate. The youngest specimens, however, show a very decided greenish or purplish lustre. While the length and proportions of the tibia, tarsus and toes are remarkably constant, the size of the whole bird, and more particularly that of the bill, varies greatly. The difference in the length of the bill of five specimens now before me amounts to three-tenths of an inch, and in that of the whole bird to considerably more than an inch. A specimen from Greenland is the smallest, having the wing four-tenths of an inch shorter than in one from New Hampshire. In this specimen the legs and feet are dusky-green instead of flesh-colored, and the bill is scarcely lighter at base.

Owing to the striking peculiarities of form and color which this species presents, there has been, contrary to what is usually the case with the Sandpipers known to the earlier authors, comparatively little confusion regarding it. As far as I have been able to ascertain, it has been considered as a true *Tringa* by all authors except Bonaparte (who refers it to *Pelidna*) up to the time of the General Report, in which work it is very properly made the type of a distinct genus. Most authors have also adopted the original specific appellation given by Brünnich in 1764; and I have not met with any other name in works published since 1819, in which year it is given as "Le tringa cendré du Canada, *Tringa Canadensis*, Lath." by Vieillot. There can be no doubt with regard to the bird which is referred to under this head; for after a description which applies well to the usual immature plumage, (not that of the very young given in the diagnosis,) the author adds, "mais ce qui distingue cet oiseau de ceux de son genre, c'est d'avoir les jambes couvertes de plumes jusqu' au talon, et même au-dessous,"—a feature which exclusively characterizes the *A. maritima*. *Tringa undata* of Brünnich, Gmelin, &c., is considered as the young of this species in the plumage given in the diagnosis, where the light borders of the feathers of the upper parts and the transverse mottling of the lower give to the bird a somewhat wavy appearance. *Tringa striata* of Linnæus, Gmelin, &c., is generally supposed to refer to this species. Pallas gives it as *Trynga arquatella*, an appellation from which the generic name is derived.

ANCYLOCHEILUS Kaup.

Erolia, Vieillot, Analyse, 1816, 55; Typus *Scolopax subarquata* Guld., secundum G. R. Gray et Gen. Rep. (*Ærolia*, Vieill., Gal. 1834 = *Erolia*.)

Ancylocheilus, Kaup, Sk. Ent. Eur. Thierw. 1839, 50; Typus *Tringa subarquata*, Temm.

Char.—Bill much longer than the head, slender, compressed, considerably decurved, the tip not expanded, and rather hard. Grooves in both mandibles very narrow, but distinct. Wings long, pointed. Tail very short, nearly even. Legs long, slender; tarsus and tibia both lengthened, the latter exposed for nearly or quite half the length of the former. Toes moderate, slender, slightly margined, the middle one about three-fourths the tarsus.

The essential characters of this well marked genus lie in the long, slender, decurved bill, with hard unexpanded tip, the long slender legs, and very short, nearly even tail. In addition, it may be stated that the groove in the upper mandible, except just anterior to the nostrils, is very narrow, though deep; the feathers extend between the rami scarcely further than those on the side of the lower mandible, which exceed those on the upper but little; the tip of the bill is pointed and acute; the claws are all very slender and acute. In form this genus approaches nearest to *Pelidna*, from which, however, it is perfectly distinct and easily recognizable. The bill of the latter is much stouter, depressed instead of compressed, and the feathers extend to some distance between the rami of the lower jaw. The tail is longer and deeply doubly emarginate. An important difference is to be found in the legs, in the proportion of the tibia, tarsus and toes. In *Pelidna* the toe is nearly equal to the tarsus, which is considerably more abbreviated than in *Ancylocheilus*. The tibiæ appear to be exposed to a less extent.

According to Gray and to the General Report, *Erolia* of Vieillot (Anal. 1816, ut suprà) is founded upon the present bird. With every disposition to rely upon such authority, in a careful examination of the characters of the genus in in that work and in the *Nouv. Dict.* (1817,) as well as of *Ærolia* in the *Galerie*, (1834,) I have been unable to reconcile them with those of the bird now under consideration. In all these works, apparently the most important characters are stated to be the absence of the hind toe, and the presence of a membrane between the outer and middle, neither of which features exist in the *Scolopax subarquata*, Guld. In the *Galerie*, reference is made to the *Nouv. Dict.*, (x. page 409,) where the genus is fully characterized. A portion of the diagnosis is as follows:—"Erolie, *Erolia* Vieill. Genre de l'Ordre des *Echassiers*, et de la famille des *Ægialites*.—trois doigts devant, *point derrière;* les exterieurs unis à la base par une membrane, l'énterne libre. Ce genre ne content qu'une espèce qui se trouve en Afrique, et dont on ne connoit que la dépouille." It will be seen that the author places the bird ("dont on ne connoit que la dépouille") not only in a different genus, but in a family entirely distinct from the Sandpipers; and the description of "L'Erolie varié, *Erolia variegata*, Vieill., which follows, I cannot identify with any plumage of *Tringa subarquata* with which I am acquainted. It should also be borne in mind that Vieillot (Nouv. Dict., ut infrà) correctly describes the present bird under the name of "Le tringa cocorli, *T. subarquata*, Temm.," and no reference whatever is made to *Erolia*. Now, it is by no means impossible that *Erolia variegata* may have been positively identified with *T. subarquata* by actual examination of the type specimen, or otherwise; but even in that case I do not think the name should be adopted. The position of *Erolia variegata* in the system is very different from that which *Tringa subarquata* occupies, and the characters of the genus as published to the world are widely at variance with those presented by that bird.

From these considerations therefore I have adopted *Ancylocheilus* of Kaup, (1829,) concerning which there is no doubt.

ANCYLOCHEILUS SUBARQUATA (Guld.) Kaup.—Curlew Sandpiper.

Scolopax subarquata, Guldenstaedt, Nov. Com. Petrop. 1775, xix. 471, tab. xviii. fide Gen. Rep. Gmelin, Syst. Nat. 1788, i. 658.

Scolopax africanus, Gmelin, Syst. Nat. 1788, i. 655.
Tringa subarquata, Temminck, Man. 1820, ii. 609. Vieillot, Nouv. Dict. xxxiv. 1819, 454. Nuttall, Man. 1834, ii. 104. Jenyns, Man. 1835, 208. Audubon, Orn. Biog. 1835, iii. 444; id. Birds Amer. 1842, v. 269, tab. 333; id. Syn. 1839. Schinz, Eur. Faun. 1840, i. 320. Macgillivray, Man. Brit. Orn. 1842, ii. 71. Giraud, Birds L. I. 1844, 237. Schlegel, Rev. Crit. 1844, 88. Dekay, N. Y. Fauna, 1844, 239, tab. 95, fig. 213. Gray, Genera, 1849, iii. 579. Degland, Orn. Eur. 1849, ii. 225. Meyer, Brit. Birds, 1857, v. 91. Nilsson, Scand. Faun. 1858, ii. 239.
Pelidna subarquata, Bonaparte, Comp. List, 1838, 50; id. Rev. Crit. 1850, 185.
Ancylocheilus subarquata, Kaup, Eur. Thierw. 1829. Parzudaki, Cat. Ois. Eur. 1856, 14.
Numenius subarquata, Bechstein, Nat. Deut. iv. 148, fide Temminck.
Numenius pygmæus, Bechstein, Nat. Deut. iv. 135, fide Temminck.
Numenius ferrugineus, Meyer, fide Vieillot.
Numenius africanus, Latham, Ind. Orn. 1790, ii. 712.
Erolia variegata, Vieillot, Anal. 1816; id. Nouv. Dict. 1817, x. 409, secundum Gen. Rep. Lesson, Man. 1828, ii. 302.
Ærolia varia, Vieillot, Gal. des Ois. 1834, ii. 89, tab. ccxxxi.; (=*Erolia variegata.*)
Falcinellus cursorius, Temminck, fide Parzudaki.
Tringa (*Tringa*) *subarquata*, Bonaparte, Specch. Comp. 1827, 62.
Pelidna (*Ancylocheilus*) *subarquata*, Bonaparte, Cat. Met. 1842, 60.
Tringa (*Erolia*) *subarquata*, Cassin, Gen. Rep. 1858, 718.

Sp. Char.—Form typical of the genus. *Adult.* Crown of head and entire upper parts lustrous greenish black, each feather tipped and deeply indented with bright yellowish red. Wing coverts ashy brown, each feather with a shaft line of dusky and with reddish edging. Primaries deep dusky, their shafts brown at base and black at tip, the central portion nearly white. Upper tail coverts white with broad bars of dusky, and tinged at their extremity with reddish. Tail light greyish with greenish reflections. Sides of the neck and entire under parts uniform deep brownish red. Under tail coverts barred with dusky. Axillars and under wing coverts white. Bill and legs greenish black. *Young in autumn.* Crown of head and back brownish black, with a slight greenish lustre, each feather edged with white or reddish yellow. Rump plain dusky, upper tail coverts white. Wing coverts with broad greyish-white borders. Tail light ashy, edged and tipped with white, the central feathers with a subterminal dusky border in addition. Under parts entirely white, the breast and sides of the neck finely streaked with dusky, the former with a light buff tinge.

Length 8·5, wing 4·9. Bill (average) 1·5. Tarsus 1·3; toe ·9; tibia bare ·7.

Habitat.—"Atlantic coast of United States; rare. Europe, Asia, Africa." (Gen. Rep.)

The variations in both plumage and dimensions which this species presents are very great, fully equal to those exhibited by *Tringa canutus*. I have given above the colors of the adult and of the young of the first fall, between which there may be found every gradation, more especially in reference to the red of the under parts, which at different ages appears as mottling of greater or less extent. The species may, however, be easily recognised in every stage of plumage by its generic characters. The single American specimen before me differs from European skins in a shorter stouter bill, in a shorter tarsus and toes, and in a remarkably abbreviated hind toe.

There has been considerable confusion among writers with regard to the synonymy of this species. It has received quite a variety of both generic and specific appellations, and from its many changes of plumage several nominal species have arisen. The bird was first mentioned, in 1775, by Guldenstaedt, (Nov. Comm. ut suprà,) who introduced it under the name of *Scolopax subarquata*. This specific appellation is the one which has been employed by most

authors. It has been placed in *seven* different genera,—*Scolopax*, *Numenius*, *Tringa*, *Falcinellus*, *Pelidna*, *Ancylocheilus* and (according to Gen. Rep.) *Erolia*. It was probably the long, slender, decurved bill which caused some of the earlier authors to consider it as a *Numenius*. The *Numenius subarquata*, Bechst., or the *Scolopax subarquata*, Gm., is the summer plumage of this species, and the *Numenius Africanus*, Lath., or the *Scolopax Africanus*, Gm., the winter. The *N. ferrugineus*, Mey. is this species, according to Vieillot; and Temminck also gives *N. pygmæus*, Bechst. as a synonym, considering it as the young before the first moult. The "Red Sandpiper" of Latham and Pennant refers to this species, though in the synonymy the former gives *T. Icelandica*, Linn. and *T. ferruginea*, Brünn., both of which names are synonyms of *T. canutus*. The relationships of *Erolia variegata* or *Ærolia varia* have already been discussed under the head of *Ancylocheilus*.

PELIDNA Cuvier.

? ? Schœniclus, Mœhring, Gen. Av. 1752, 77.
Pelidna, Cuvier, Regne Anim. 1817, 490. Typus *T. cinclus*, L.

Char. Bill stout, much longer than the head or tarsus, decurved, depressed, tip somewhat expanded and punctulate. Grooves in both mandibles very deep and distinct. Wings moderate; tertials long, narrow and flowing. Tail rather long, deeply doubly emarginate, the central feathers projecting. Legs moderate, or rather long. Tarsus but little if any longer than the middle toe. Bare portion of tibia more than half the tarsus. Toes rather long, and narrowly margined.

The essential characters of this genus lie in the long, stout, decurved bill, longer than the head or tarsus, and the tarsus but little longer than the middle toe, approaching in this respect to *Actodromas*, to which, in the doubly emarginate tail and, to some extent, the general pattern of coloration and changes of plumage, it is still more nearly related. Its affinities to *Ancylocheilus*, which are close, will be found discussed under that head. The genus is very variable in the length of its bill, though the legs, as usual among the *Tringeæ*, are pretty constant. The colors of the two species of the group are subject to many and great variations dependent upon age and season, which in each have given rise to a second nominal species. In addition to these, minor differences in size and color have been made the grounds of specific distinction by some European writers. With these, however, the present monograph has nothing to do, since, in according to the American bird specific distinction from that of Europe, the intricate and difficult synonymy of the latter is excluded.

The genus *Pelidna*, of Cuvier, (1817), has been employed by different writers in a very unnatural manner to designate the smaller Sandpipers indiscriminately, nearly all the species having been at one time or another included in it, grouped together without the slightest regard to their natural affinities. This is perhaps due in a measure to the very loose manner in which it is characterized by Cuvier, who merely says, in instituting the genus,—"les Pelidnes ne sont que de petites maubèches, à bec un peu plus long que la tête, et dont les pieds n'ont ni bordures ni palmures." The genus has in consequence fallen somewhat into disrepute among later ornithologists, who generally avoid the use of it; but still it must stand for the type upon which it was founded (*T. cinclus*, L.) if no other name has been previously proposed for the same group. *Schœniclus*, of Mœhring, (1752), is said by some authors to refer to that type; but I can find no characters which restrict it to the *T. cinclus*. The brief diagnosis is as follows: "Rostrum digitis cum ungue fere æquale. Pes tetradactyla. Membrana dimidium primum articulum inter extimum et medium digitum occupans." Now as the bill is not "about equal to the middle toe and claw," but very much longer, and as there is scarcely the rudiment of a membrane between the outer and middle toe, which does not nearly occupy "half the first joint," the only character left which really belongs to the *T. Alpina* is "pes

tetradactyla," which of course applies equally well to any other Sandpiper except *Calidris arenaria*.

In the uncertainty, therefore, it may be best to use *Pelidna* of Cuvier, which, although loosely characterized, is definitely located by the mentioning of the type upon which it is founded.

PELIDNA AMERICANA (Cass.) Coues.—American Dunlin.

Tringa alpina, Wilson, Am. Orn. 1813, vii. 25, tab. lvi. fig. 2; id. Ord. Ed. 1829, iii. 136; id. Brewer Ed. 1840, 475, fig. 220; (nec Linnæi, nec al. script. Europ.) Swainson, F. B. A. 1831, ii. 383. Nuttal, Manual, 1834, ii. 106. Audubon, Orn. Biog. 1835, iii. 580, tab. 290; id. Syn. 1839, 234; id. Birds Amer. 1842, v. 266, tab. 332. Girard, Birds L. I. 1844, 228. Newberry, P. R. R. Expl. 1857, vi. 100.

Tringa (*Tringa*) *alpina*, Bonaparte, Obs. Wils. 1825, v. 92.

Tringa cinclus, Wilson, Am. Orn. 1813, vii. 39, tab. lvii. fig. 3; id. Ord. Ed. 1829, iii. 138; id. Brewer, Ed. 1840, 484, fig. 225; (nec Linnæi, nec al. script. Europ.) Dekay, N. Y. Faun. 1844, 240, tab. 84, fig. 292.

Pelidna cinclus, Bonaparte, Comp. List, 1838, 50.

Tringa alpina, var. *Americana*, Cooper et Suckley, Nat. Hist. Wash. Terr. 1860, 239.

Tringa (*Schœniclus*) *alpina*, var. *Americana*, Cassin, Gen. Rep. 1858, 719.

Sp. char. Larger than *P. alpina*. Bill longer, stouter and more decurved than in the type of the genus. Wings moderate, pointed, first primary decidedly longest. Tail rather long, deeply doubly emarginate, the central feathers projecting, the upper coverts much lengthened. Legs much longer than in *P. alpina*, the tarsus decidedly longer than the middle toe. *Adult in breeding plumage.*—Crown of head and upper parts generally bright chestnut red, the feathers with a central field of black, and on the scapulars with whitish margins. Lesser wing coverts plain greyish ash, each feather with a shaft line of dusky and with a light border; greater broadly tipped with white. Outer vanes and tips of primaries deep dusky, almost black, those of the inner edged with white towards their bases; inner vanes of all light ashy. Secondaries mostly white. Tertials with the rump and upper tail coverts brownish black, with either plain greyish or light reddish edges, the outer pair of the latter mostly white. Central tail feathers brownish black, the rest light greyish ash. Forehead, line over the eye and whole under parts white, the jugulum with numerous longitudinal lines and streaks of brownish black, and the belly with a very broad bar of pure black. Legs, feet and bill black. *Adult in winter, and young.*—Upper parts a uniform dark ash, generally with traces of the reddish on the scapulars, and the feathers with darker shaft lines. White edgings of inner primaries very conspicuous. Jugulum with an ashy suffusion, and with numerous illy defined, blended streaks of dusky. Rest of under parts pure white.

Length 8·5, extent 14·5, wing 4·9, tail 2·3. Bill above 1·6, tarsus 1·1, middle toe ·95, tibia bare, ·6.

Habitat. Continent of North America.

Although it may seem a hazardous undertaking to separate the Dunlins of America and Europe, yet on the authority of that most accurate ornithologist, Mr. Cassin, and from the testimony of numerous specimens from both countries before me, I cannot but come to the conclusion that they are specifically distinct. The uniformly larger size, the disproportionately longer, stouter and more decurved bill, and the invariably longer and differently proportioned legs, are discrepancies which can hardly be allowed to exist in the same species. The constancy of these differences in so notoriously variable a bird as the present, as well as their radical nature, are indications which cannot be neglected. The distinctive characters being entirely those of size and proportion, the comparative measurements of three specimens from each country is subjoined:

[July,

Name.	Length.	Extent.	Wing.	Bill.	Tarsus.	Toe.
Pelidna Americana.....	8·50*	15·40*	4·70	1·50	1·08	·98
" "	9·00*	14·00*	5·05	1·74	1·13	1·05
" "	8·25*		4·65	1·54	1·03	·95
Pelidna alpina.....	7·90†		4.25	1·40	·90	·90
" "	8·10†		4·70	1·42	1·02	·88
" " (" Schinzii,")...	8·40†		4·50	1·40	·92	·85

* Fresh; on authority of collector. † Of skin; approximate only.

The comparative diagnoses would be briefly as follows:

P. alpina. Length 8 inches. Bill, average, 1·4. Tarsus but little if any longer than middle toe. Length of tarsus and toe 1·75.

P. Americana. Larger; length 8·5 inches. Bill average 1·7; disproportionately longer, stouter, more decurved. Tarsus decidedly longer than the middle toe; legs considerably longer; length of tarsus and toe 2 inches.

Among the specimens from the west coast there appear to be two very decided types. One is that common to the Atlantic coast, in which the bill measures on an average 1·50 of an inch in length, and the wing 4·60. Of the other there are three specimens before me, collected at different times, absolutely identical in size and proportions, and differing greatly both from eastern specimens and all others from the west coast. In these the bill measures 1·72 of an inch, being nearly a fourth of an inch longer than in *P. Americana;* the wing is nearly five inches; the legs are somewhat longer, and the whole bird considerably larger. The differences, indeed, between these specimens and the average of *P. Americana* are nearly if not quite as great as those which separate that latter species from the *alpina.* These facts are of importance, and would seem to point to one of the following considerations:—either the three specimens alluded to belong to a species distinct from the *Americana*, or that they represent one extreme, and *P. alpina*, or more properly *T. Schinzii*, Brehm.,* the other of one and the same species, of which *P. Americana* is the intermediate form. I cannot but think, however, that the former supposition is the most probable; for it seems almost impossible in one species there should be such variations, and those too of such a radical nature as are presented by specimens of *Pelidna* from different localities. Thus, to consider a bird in which the bill measures 1·20, the leg 1·75, and the wing 4·40, (as in the smallest specimen of *Pelidna* before me,) as specifically identical with one in which these parts were respectively 1·75, 2·10 and 4·95, would be almost without a parallel in ornithology; while, at the same time, if they be considered distinct, it is impossible to avoid recognizing also the intermediate form. But if, as I think has been pretty conclusively shown, the American bird is distinct from the European, then the west coast specimens above referred to are equally worthy of specific distinction.† Still, with but three specimens before me, I do not venture, in the case of so variable a bird as a Sandpiper, to present it as distinct; but should the above differences be found constant, and showing no graduation towards the *Americana*, I should have no hesitation in so doing. In the event of their proving really distinct, I would propose the name of *Pacifica* as an appropriate one.

* With but a single specimen of *Tringa Schinzii* before me, I am not prepared to express any opinion with reference to its relationships to *Pelidna alpina.* In this paper I consider it as merely a smaller race of the latter, entirely upon the high authority of the General Report.

† In the field notes of the late Dr. C. B. R. Kennerly, I find the opinion expressed that they are distinct; and I am informed by Dr. Geo. Suckley, U. S. A., that he has always doubted the specific identity of the various specimens of *Pelidna* from the west coast. Both of these gentlemen have enjoyed excellent opportunities for observation and comparison, and their opinions should carry with them considerable weight.

The above remarks are made rather with the view of calling attention to the facts, than as presenting any solution of the problem. The whole subject is one of great interest, and well worthy of extended and careful investigation.

ACTODROMAS, Kaup.

Actodromas, Kaup, Sk. Ent. Eur. Thierw. 1829, 55 ; Typus *Tringa minuta*, Leisl.

Char. Bill about equal to the head or tarsus, short, straight, very slender, somewhat compressed, the tip punctulate, scarcely expanded, acute. Grooves on both mandibles very deep, and extending nearly to the tip. Nostrils situated very near the base of the bill. Feathers extending on the lower mandible much beyond those on the upper, and half as far as those between the rami. Wings long, pointed, first primary usually longest; tertials long, slender, flowing. Tail rather long, deeply doubly emarginate, the central feathers much projecting; upper tail coverts moderately long. Tibia bare for more than half the length of the tarsus ; the feathers very short, making the exposed portion nearly as great. Tarsus equal to the middle toe. Toes long, slender, very narrowly margined, entirely free at base. (In typical species the jugulum with an ashy or brownish suffusion, thickly streaked ; the rump and upper tail coverts with a central blackish field.)

The genus *Actodromas*, of Kaup (1829) includes a well marked and very natural group of Sandpipers, the quite numerous species of which are very closely related both in form and colors. Its type, from which I have drawn the characters in the preceding diagnosis, is the *T. minuta*, Leisl., a European species not occurring in North America, being replaced in that country by the *Tringa Wilsoni* of Nuttall, a very closely allied species, and one with which it has been confounded by some authors. The essential characters of the genus lie in the short, straight, slender bill, which equals the head or tarsus ; the long slender toes, the middle equal to the tarsus; the much denuded tibia with its short feathers, and the long, deeply doubly emarginate tail. The peculiar proportions of bill, tarsus and toe are shared by no other Sandpipers, so far as my knowledge extends. The genus is divisible into two well-marked sections : *Actodromas* proper, with the type *T. minuta*, having its characters strictly as above ; and *Heteropygia*,* with the *Tringa Bonapartei* as type. The latter differs in the stouter bill, more expanded at tip; in the much less extent of the encroachment of the feathers on the lower mandible ; in the longer legs, the tarsus rather exceeding the middle toe ; in the entire absence of the brownish or ashy suffusion on the jugulum, and in the white upper tail covers. In this section I have placed the *Tringa Cooperi* of Baird, which is most closely related to the *A. Bonapartei*, and is at any rate an *Actodromas* rather than a true *Tringa*.

The species of the genus now ascertained to inhabit North America are five in number: *A. maculata*, *A. minutilla*, and the new *A. Bairdii*, coming under *Actodromas* proper; *A. Bonapartei* and *A. Cooperi*, which compose the section *Heteropygia*. The three first of these are so nearly alike in colors, that, their form being absolutely identical, size is the chief specific difference. *A. maculata* is much the largest, being about nine inches in length ; *A. minutilla* is very small, being less than six inches; while *A. Bairdii* is exactly intermediate between the two, measuring a little over seven inches.

The following brief schedule will serve to distinguish the five species, when in adult breeding plumage :—

Actodromas, Kaup.

A. Jugulum with a brownish or ashy suffusion, thickly streaked. Rump and upper tail coverts with a central black field.

* The name is used with reference to the most conspicuous, though probably not most important, feature in which it differs from *Actodromas* proper. The combination being rather an obvious one, the name may have been already employed ; in that event I would suggest *Delopygia* with much the same signification.

1. Much the largest; length about 9 inches, wing (average) 5·25. Crown much darker than the hind neck, the transition abrupt. Chin immaculate. Edgings of feathers on upper parts light chestnut-red, not making indentations towards the shaft. Suffusion on jugulum very deep, the streaks narrow, distinct. Central tail feathers long, pointed, much projecting. Bill and legs dusky green, *maculata.*
2. Smaller; length 7·25 inches, wing 4·8. Crown not conspicuously darker than hind neck. Edgings of feathers on upper parts light reddish yellow, scarcely brighter on the scapulars, making indentations towards the shaft. Suffusion on jugulum very light, the markings rounded, somewhat obsolete. Central tail feathers rounded, less projecting. Bill and legs black, *Bairdii.*
3. Much the smallest; a miniature of the preceding; length 5·75; wing 3·4. Edges of feathers chestnut-red, usually more or less indented, tips lighter. Bill black, legs dusky green, *minutilla.*

Heteropygia, Coues.

B. Jugulum without an ashy or brownish suffusion. Upper tail coverts white.

4. Length 7·5. Jugulum thickly streaked with rather narrow lines. Upper tail coverts immaculate, except the outer pair. Central tail feathers nearly black, considerably projecting, *Bonapartei.*
5. Much larger; length 9·5. Jugulum with sparse, rather broad oval spots or streaks. Upper tail coverts with sagittate spots of dusky. Central tail feathers scarcely darker than the lateral, projecting but little, *Cooperi.*

Comparative Measurements of Species.

Name.	Sex.	Length.	Extent.	Wing.	Bill above.	Tarsus	Middle Toe.	Outer Toe.	Coverts to end of tail.	Central Feathers project.
A. maculata.		9·00*		5·35	1·12	1·12	1·12	·90	·80	·52
do.	♀	8·50	16·50	5·00	1·15	1·10	1·12	·92	·80	·40
do.		9·10	18·20	5·55	1·20	1·14	1·14	·92	·90	·42
A. Bairdii.	♂	7·15		4·90	·85	·83	·83	·70	·60	·20
do.	♂	7·25	15·25	4·85	·86	·88	·88	·72	·50	·15
do.	♂	7·25	15·25	4·80	·86	·90	·82	·69	·63	·16
A. minutilla.	♀			3·35	·74	·69	·78	·61	·45	·18
do.	♂	6·00	11·30	3·35	·72	·75	·79	·64	·40	·25
do	♂	6·00	12·00	3·56	·74	·75	·85	·66	·58	·20
A. Bonapartei.	♂	7·40	15·00	4·70	·94	·98	·95	·80	·80	·29
do.				4·85	·88	·98	·90	·80	·80	·22
do.	♂	7·40	15·10	4·80	·95	·92	·91	·75	·75	·22
A. Cooperi.	♂	9·50		5·75	1·23	1·14	1·08	·95	·85	·15

ACTODROMAS (ACTODROMAS) MINUTILLA (Vieill.) Coues.—Least Sandpiper.

Tringa minutilla, Vieillot, Nouv. Dict. 1819, xxxiv. 452, (haud dubie.) "Vieill," Gray, Genera, 1849, iii. 579.

Tringa pusilla, Wilson, Am. Orn. 1813, v. 32, tab. xxxvii. fig. 4; id. Ord. Ed. 1829, iii. 134; id. Brewer, Ed. 1840, 347, fig. 161. (Nec Linnæi; nec Meyer; nec Bechst.) Swainson, F. B. A. 1831, ii. 386. Audubon, Orn. Biog. 1838, iv. 320, tab. 180; id. Syn. 1839, 237; id. Birds Amer. v. 1842,

*The measurements of the length and extent are from the fresh bird, and on the authority of the collector.

280, tab. 337; Giraud, Birds L. I. 1844, 240. Gray, Genera, 1849, iii. 579. Woodhouse, Expl. Zuni. 1853, 100.

Pelidna pusilla, Bonaparte, Comp. List, 1838, 50. Gosse, Birds Jamaica, 1847, 348.

Tringa Wilsoni, Nuttall, Man. 1834, ii. 121. Cooper et Suckley, Nat. Hist. Wash. Terr. 1860, 240.

Tringa (*Tringa*) *pusilla*, Bonaparte, Comp. Specch. 1827, 237.

Tringa (*Actodromas*) *Wilsoni*, Cassin, Gen. Rep. 1858, 721.

Sp. Char.—The smallest of North American *Tringeæ*. Bill straight, very slender, about equal to the tarsus, but varying somewhat, the tip scarcely expanded, and the point very acute. Wings long, first and second primaries about equal, third but little shorter. Tertials very long, frequently nearly equalling the primaries. Tail rather long, the central feathers moderately projecting and rather rounded. Middle toe frequently slightly longer than tarsus. Upper parts generally with each feather having a central black field, and being edged with chestnut and tipped with ashy white, the margins making a deep indentation in the middle of the feather. Outer row of tail coverts white, with large, sagittate, dusky spots. Central tail feathers black, edged with light reddish, the others very light ashy with whitish borders. Primaries deep dusky, almost black, the shaft of the first white. Secondaries and greater coverts dusky, lighter on the inner vanes, and tipped with white. An indistinct whitish line over the eye, and a dusky one between the eye and bill. Jugulum and sides to some distance with a very decided brownish suffusion, and thickly marked with rounded spots and streaks of dusky. Chin and under parts generally white, the former usually with minute points of dusky. Legs, feet and bill greenish dusky, the latter nearly black.

Length 5·5 to 6, extent 11·5 to 12, wing 3·4. Bill, tarsus and middle toe about ·75.

Habitat.—Entire temperate North America.

The diminutive size of the present species at once distinguishes it from any other Sandpiper now recognised as an inhabitant of North America; but in view of the species of other countries with which it is very closely allied, and especially of the uncertainty whether there be not two or more distinct species in North America, a more minute description may not be considered as unnecessary In addition, therefore, to the preceding diagnosis, which presents the principal characters of adult individuals, the following remarks may tend to define it with more precision.

In apparently adult specimens, the general style of coloration much more closely resembles that of *Bairdii* than of *maculata*, in the rounded black spots and color of the edgings, as well as in the scolloping at the middle of each feather. Young birds, however, are precisely similar to the *maculata* in the same stage, having the edges of the feathers bright chestnut, and the tips pure white. In this respect the species departs from the general rule with regard to young birds, the plumage at that age being actually brighter than during the breeding season. The same is the case with the *A. maculata*. An evidence of immaturity, however, may always be found in the color of the jugulum, where the wash is simply dull ashy, and the streaks narrow and illy defined. The chin, too, is immaculate, while with the adults it is usually minutely dotted with dusky. The young have the lesser wing coverts broadly margined with light reddish, while the adults have them merely a lighter shade of the color of the rest of the feather. The color of the jugulum is much that of *A. Bairdii*, being of the same decided brownish tint; and the similarity is heightened by the rounded and somewhat obsolete character of the spots. The color of the breast extends along the sides about half way to the tail, but some feathers are marked with dusky quite to the vent. The under tail coverts are usually immaculate, but sometimes have shaft lines of dusky. The primaries are deep dusky, still darker at tip, the shaft of the first being white for its entire length,

the other having their bases and tips brownish. The secondaries and greater coverts are nearly as dark as the primaries, both conspicuously tipped and their inner vanes edged with white. The axillary feathers are white; and, in the closed wing, a portion of the under coverts form a large triangular patch of white near the shoulder.

A specimen from the west coast presents a very remarkable pattern of coloration. It has not the least trace of any reddish or chestnut, being everywhere of a uniform dark ash, each feather with a central spot or shaft line of dusky. The rump is scarcely darker than the back. The breast is merely a lighter shade of the color of the back, and the streaks are so indistinct as to be scarcely perceptible. This is very different from the plumage of the young given above; and it is not impossible that the bird is of a species distinct from the one now under consideration. The general pattern, however, is very similar to that presented by the young *Bairdii;* and in the absence of any differences of size or proportions, and with but a single specimen before me, I am unwilling to risk adding another name to the already overburdened synonymy of the smaller Sandpipers. In another specimen, also from the west coast, the prevailing color of the upper parts is almost black, the feathers, except on the scapulars, being scarcely edged with reddish; and the streaks on the breast are very numerous and dark, upon a nearly white ground. This state of plumage is exactly parallel with that sometimes exhibited by undoubted specimens of *A. maculata.*

The relationship of this species to the European *A. minuta* are close; and, with but a single very defective and immature skin of the latter before me, I cannot well state the points of difference; but all authors are agreed upon the specific distinction of the two. As far as I can judge, *A. minuta* is considerably the largest, (wing 3·85 instead of about 3·4,) and the proportions of the primaries are quite different from those of *A. minutilla.* *A. minuta* has been given as an inhabitant of North America by both Swainson and Nuttall, but probably upon insufficient or erroneous data.

With regard to this little Sandpiper, there has been considerable confusion among authors, arising partly from the great similarity it bears to some other species, such as the *Tringa minuta* and *Temminckii*, and partly from a misinterpretation of the *T. pusilla** of Linnæus. This name was applied by Wilson, in 1818, to the species now under consideration, and is adopted by Swainson, Audubon and some other writers. The *T. pusilla* of Nuttall ("stint or little sandpiper") is *T. Temminckii*, Leisl., and is erroneously given as an inhabitant of North America. What "Le tringa béco, *T. pusilla*, Lath.," of Vieillot refers to is a little doubtful. The author quotes plate 37, fig. 4 of Wilson's Ornithology, which is *T. pusilla*, Wils. (*T. Wilsoni*, Nutt.;) and also cites the "petite Alouette-de-mer de Saint-Domingue" of Brisson, which is *T. semipalmata*, Wils. (*Ereunetes pusillus*, Cass.) The description, however, especially with reference to the stout bill, traces of reddish on the under parts, &c., seems rather to point to the latter, which it may be best to consider it, even though no mention is

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* For convenience of reference, the four species to which the name *pusilla* was originally applied, with their more prominent synonyms, are here inserted.

Tringa pusilla, Linnæus = *Ereunetes petrificatus*, Illiger = *Tringa semipalmata*, Wilson = *Heteropoda semip.*, Nuttall, and *Hemipalama semip.*, Bonaparte = *Ereunetes pusillus*, Cassin; (*Heteropoda mauri*, Bonaparte, and *Hemipalama minor*, Gundlach, are synonymous?)

Tringa pusilla, Meyer = *Tringa minuta*, Leisler = *Actodromas minuta*, Kaup.

Tringa pusilla, Bechstein = *Tringa Temminckii*, Leisler = *Actodromas Temminckii*, Bonaparte.

Tringa pusilla, Wilson = *Tringa minutilla*, Vieillot = *Tringa Wilsonii* Nuttall = *Actodromas Wilsoni*, Cassin = *Actodromas minutilla* of the present article.

It will thus be seen that *Tringa pusilla* of Linnæus, Meyer, Bechstein and Wilson refers to four distinct species.

made of the webbed feet. The remarks made in this article, under the head of *Ereunetes pusillus*, will, it is hoped, show that the name *pusilla* was originally used in a very different connection, and hence cannot be employed for the present species. Bonaparte, as early as 1825, seems to have been aware that the *T. pusilla* of Linnæus was not the bird given under that name by Wilson; for in his Observations on the Nomenclature of Wilson's Ornithology, on the subject of *T. semipalmata*, Wils., he gives as a reason for not adopting *pusilla* for that latter species, that "several species have been confounded together under the name of *T. pusilla; and although the present* (*T. semipalmata*, Wils.) *is the real species*, it would be adding to the existing confusion to change the most appropriate name of *semipalmata*, given by the author who first separated the species, in order to apply a name generally given to another, to which in that case we ought to give a new name." In 1834, Nuttall applied the name *Wilsoni* to a species whose manners and habits he described so accurately that there can be no doubt of its referring to the bird now under consideration, though he, too, fell into the error of quoting *T. cinclus dominicensis minor*, Briss. This name *Wilsoni* being supposed to be the only one hitherto applied to the species, (except of course *pusilla*, untenable for the reason already given,) is the one in general use among more modern ornithologists. In view of the existing confusion, it is with great reluctance that I adopt still another name for this species; but the *Tringa minutilla* of Vieillot points so unmistakeably to the present bird, that a strict adherence to the laws of ornithological nomenclature renders this necessary. This author (page 466 of the Nouv. Dict.) says: "Le nom que j'ai conservé à cet oiseau est celui sous lequel il est connu dans nos colonies d'Amerique, et qui lui a été imposé d'après sa petite taille .... il a des rapports avec le *tringa minuta* de Leisler .... je l'ai souvent vu à Halifax, et dans la Nouvelle-Ecosse .... comme les tringas becos," (*T. semipalmata*, Wils.?) "se comport de même, il en est resulté qu'on les a confondus ensemble." There is no North American Sandpiper but the present remarkable for its diminutive size, and having relationships with the *T. minuta*, Leisl., that is found in Nova Scotia, except the *T. semipalmata*, Wils., with which, as the author remarks,* it is sometimes confounded, from a general similarity in habits and appearance. The description given applies well; and in some particulars, such as the length (quatre pouces dix lignes) and the proportions of the bill, ("noir, très-grêle, et long de neuf legnes; les tarses de la même longeur,") can refer to no other North American Sandpiper.

From these considerations therefore I adopt the name *minutilla*, at least until some weightier reasons be adduced to disprove the position assumed.

ACTODROMAS (ACTODROMAS) BAIRDII Coues.—Baird's Sandpiper.

Tringa (*Actodromas*) *Bonapartei*, Cassin, Gen. Rep. 722. In part.

Sp. Char.—Form and proportions typical of the genus. Bill small, slender, rather shorter than the head, equal to the tarsus, the tip scarcely expanded, its point very acute. Grooves in both mandibles very long and deep, that of the lower very narrow. Feathers extending on the side of lower mandible much farther than those on the upper, about half as far as those between the rami. Wings long; first and second primaries about equal, but varying, third much shorter; tertials long, slender, flowing. Tail rather long, but slightly doubly emarginate, the central feathers rounded, projecting but little. Toes long, slender, slightly margined, the middle with its claw about equal to tarsus. *Adult in breeding plumage.* Entire upper parts a very dark brownish black, deeper on the rump and lighter on the neck behind, each feather bordered and tipped with light reddish yellow; on the scapulars the tips broader and nearly pure white, and the margins brighter, making several deep indentations towards

* If, as is probably the case, "le beco" be the *T. semipalmata*, Wils.

the shaft. Upper tail coverts long, extending to within half an inch of the tips of the central tail feathers, black, except the outer series, which are white with dusky markings. Central tail feathers brownish black, the rest successively lighter, and all with a narrow border of white. Jugulum with a very decided light brownish suffusion, (much as in *A. maculata*,) and, together with the sides under the wings to some distance, with rounded obsolete spots and streaks of dusky. Throat and under parts generally white, immaculate. Bill, legs and feet black. *Young in August.* Dimensions and proportions as in the adult. Upper parts a nearly uniform light ashy brown, deeper on the rump, each feather with a central dark field and with a light edge. Traces of the brownish black of the adult on the scapulars. Breast and jugulum with the suffusion very light reddish brown, the streaks sparse and very indistinct.

Length 7·25, extent 15·25, wing 4·9. Bill above, tarsus and middle toe about ·85.

Habitat.—North America, east of the Rocky Mountains. Not on the Atlantic coast. (?)

The preceding diagnosis expresses the most essential characters of a Sandpiper, hitherto confounded with the *A. Bonapartei*, but nevertheless perfectly distinct from that or any other species recognized as an inhabitant of North America. Though a true *Actodromas*, and very closely related to the *A. minutilla* and *maculata*, a similarity in size, in changes of plumage, and, to some extent, in general appearance, has caused it to be referred to *A. Bonapartei*, which, however, belongs to a group subgenerically distinct. But the two differ very materially both in tints and in the pattern of coloration of the upper parts, and in the character of the upper tail coverts and the jugulum. The following brief schedule will express the chief distinctive features of each, and render further comparison unnecessary.

A. Bairdii.—Length about 7·25 inches. Bill slender, entirely black. Feathers extending on the lower mandible much beyond those on the upper. Edging of scapulars light buff color, indented. Breast and jugulum with a decided brownish suffusion, the markings rounded, sparse, rather obsolete. Upper tail coverts much lengthened, black; central tail feathers projecting but little, the emargination of the tail slight.

A. Bonapartei.—Length about 7·50 inches. Bill stout, flesh colored at base below. Feathers extending on the lower mandible but little if any beyond those on the upper. Edging of scapulars bright chestnut, scarcely indented. Jugulum and breast with a scarcely appreciable ashy wash, the streaks narrow, numerous, well defined. Upper tail coverts moderate, white; the central tail feathers considerably projecting, and tail quite deeply emarginate.

The species is a true Actodromas, and belongs subgenerically to the same group as *A. minutilla* and *maculata*, with both of which it is very closely related, and requires comparison. In size it is exactly intermediate between the two, exceeding the *minutilla* by about as much as it is itself surpassed by the *maculata*. The slender black bill is very similar to that of *minutilla*, and the general pattern of coloration almost identical. The colors, however, are everywhere much lighter; the edgings of the feathers of the upper parts being of a light reddish yellow or buff, instead of the bright chestnut red of *minutilla;* while the streaks upon the breast are fewer, less distinct and more rounded. It is considerably smaller than *A. maculata;* there is nothing of the abrupt transition from the dark crown to the much lighter hind neck, so conspicuous in the latter; the tertials want the bright reddish edgings, and the pattern of coloration of the upper parts are quite different. While the suffusion of the breast and jugulum is much the same, the markings are more rounded, sparse and indistinct. There is also a great difference in the bill, as regards size, shape and color. The species differs from both *minutilla* and *maculata* in one important respect,—the character of the changes of plumage it undergoes. The young of both the former are usually quite as bright, if not brighter, than the adults;

and the markings are all definite and distinct, while immature birds of the present species are of a nearly uniform ashy above, the suffusion of the breast very light, and the streaks so indistinct as to be scarcely appreciable. In this respect it resembles *A. Bonapartei*, with the different stages of which there is a perfect parallelism. In some stages of plumage it approaches the *A. Cooperi*, the resemblance being further enhanced by the slight emargination of the tail. The greatly superior size of the latter, however, independently of its subgeneric characters, at once distinguishes it. Some specimens show a tendency towards the general dusky state of plumage also exhibited by both *minutilla* and *maculata*, when the upper parts are very dark and nearly uniform, being scarcely relieved by lighter margins of the feathers.

The following detailed description which will serve to definitely characterize this species in the plumage of the adult during the breeding season, and of the young bird of the first fall, is taken from a very perfect male shot May 19th, at Fort Resolution, and from a young male obtained in Nebraska during the latter part of July.

The bill is of moderate length, and very slender, expanded but slightly at tip, and the point very acute; the grooves are long, extending quite to the expansion of the tip, that of the lower mandible being narrow but distinct. The bill is entirely black. The feathers encroach on the lower mandible much beyond those on the upper, about half as far as those between the rami. Their upper outline is about parallel with the culmen. There is much white about the head; the extreme forehead and the lower eyelid are white, while a broad ill-defined band of the same passes over the eye. A narrow and well defined dusky stripe passes from the eye to the nostril. The crown is streaked with dusky brown and dull ochreous, and is darker along a broad medium stripe than at the sides. The sides and back of the neck are much like the crown, but rather lighter, the transition being gradual. The upper parts generally are of a dark brownish black, every feather being edged with light reddish yellow; on the scapulars each feather is broadly bordered with bright buff, still more widely at the end with a dull shade of the same, the extreme tip being white. On most of the feathers the edging makes a deep, more or less irregular indentation, leaving the black only as a line along each side of the shaft. The long tertials, the secondaries, and greater wing coverts are dusky, fading into dull white on the edges. The lesser coverts are very dark, with scarcely lighter tips. The primaries are deep dusky, almost black, the shaft of the first white, of the others mostly brownish. The inner primaries are very narrowly edged on the outer vane with white. The tail coverts are black, the outer series with sagittate spots of white. The central tail feathers which are rounded and project but little beyond the rest, are brownish black, narrowly edged with white; the lateral light ashy, fading into white at the edges. The chin and throat are white, and immaculate or nearly so. The jugulum, breast, and sides to some distance have a very decided light brownish, or ochreous suffusion, and the makings are rather sparse, rounded, and indistinct, in the middle of the breast nearly obsolete. They are largest and most conspicuous just before the bend of the wing, where they gradually pass into the stripes of the sides of the neck. The rest of the under parts including the axillars and under wing coverts are white, immaculate. The tibial feathers are ashy; the legs and feet black.

The young has the form and proportions much as in the adult. The white about the head is much restricted, and the line over the eye so illy defined as to be scarcely appreciable as such. The upper parts generally are of a dull nearly uniform brownish ash, each feather with a shaft line of dusky, and with a lighter tip. There are traces of the brownish black of the adult at intervals, but more particularly on the scapulars, where the edgings are yellowish white. The rump and upper tail coverts are nearly as dark as on the adult. The suffusion of the jugulum and breast is a very light shade of reddish brown;

and the streaks are sparse, and so indistinct as to be in some places scarcely appreciable. The wash extends for some distance along the sides under the wings.

An intermediate, and perhaps more usual state of plumage during the winter differs in some respects from either of the preceding. The centres of the feathers of the upper parts are nearly as dark as in the adult, but they are every where rather broadly tipped with pure white. In other respects the plumage generally is much like that of the adult, except that, as might be expected, the wash on the jugulum is very light and much restricted, and the streaks very indistinct.

Upon inspection of Audubon's figure of the male of his *Tringa Schinzii*, I was inclined to think that it was taken from a specimen of the present species. It represents a male in the act of flying, and shows plainly the upper tail coverts, which are entirely dark colored, as are also the upper parts generally. In the collection, however, I find a specimen of the true *Bonapartei*, labelled "St. Augustine, Fla.," received from Mr. Audubon, which is in all probability the original of the figure. It is in the peculiar dusky state already mentioned, and agrees very nearly with the plate. His figure of the female is undoubtedly that of a true *Bonapartei*. The fact of his remarking that "In some individuals about six of the middle tail coverts are black, the lateral barred with white and dusky," show that he was acquainted with both species, but considered the differences as dependant upon sex or age. The diagnosis given by Mr. Cassin, in the General Report, of *Tringa Bonapartei*, points unmistakeably to that bird; but on the examination of the four specimens there enumerated, I find three of them to be of the present species. The differences were most unaccountably overlooked by that accurate ornithologist, though on a very cursory comparison of the types of the descriptions in the present article, with specimens of *A. Bonapartei*, he pronounced them to be totally distinct.

The first specimen of the present species procured were taken by Dr. Hayden, during the exploration of Nebraska, by Lieut. Warren. There are also specimens in the collection from Fort Kearney, by Dr. Cooper, from the Zuni river, by Dr. Woodhouse, and from the vicinity of Great Slave Lake, by Mr. Kennicott and Mr. Ross. These widely separated localities would seem to indicate a habitat co-extensive with that of *A. Bonapartei*, and probably embracing the continent of North America, east of the Rocky Mountains. I have never seen it, however, from the Atlantic coast.

In presenting to the scientific world this my *first* new species, I should do violence to my feelings, did I give it any other name than the one chosen. To Spencer F. Baird, I dedicate it, as a slight testimonial of respect for scientific acquirements of the highest order, and in grateful remembrance of the unvarying kindness which has rendered my almost daily intercourse a source of so great pleasure, and of the friendly encouragement to which I shall ever feel indebted for whatever progress I may hereafter make in ornithology.

Actodromas (Actodromas) maculata (Vie ill.) Cass.—Pectoral Sandpiper.

Tringa maculata, Vieillot, Nouv. Dict. 1819, xxxiv. 465.

Pelidna maculata, Parzudaki, Cat. Ois. Eur. 1856, 15. (*T. Bonapartei*, Schlegel per errorem citat.)

Tringa campestris, Lichtenstein, Verz. 1823, 74; (nec Vieill., 1819.)

Pelidna pectoralis, Say, Long's Exped. 1823, i. 171. Bonaparte, Comp. List. 1838, 50. Cassin, U. S. Ast. Exp. 1855, ii. 195.

Tringa pectoralis, Bonaparte, Am. Orn. 1833, iv. 43; tab. xxiii.; id. Cat. Birds U. S.; id. Syn. sp. 250; (fide Bon.) Nuttall, Manual, 1834, ii. 111. Jenyns, Manual, 1835, 210. Audubon, Orn. Biog. 1835, iii. 601; v. 582; tab. 294; id. Syn. 1839, 232; id. Birds Amer. v. 1842, 259; tab. 329. Macgillivray, Man. Brit. Birds, 1842, ii. 67. Giraud, Birds L. I., 1844, 233. Dekay, N. Y. Faun. 1844, 242, tab. 85, fig. 193. Schlegel, Rev. Crit. Ois.

Eur. 1844, 89. Gray, Genera, 1849, iii. 579. Lambeye, Aves Cubæ, 1850, 98. Woodhouse, Sitgreave's Expl. 1853, 100. Meyer, Brit. Birds, 1857, v. 89. Cooper et Suckley, Nat. Hist. Wash. Terr. 1860, 230.

Tringa Dominicensis, Degland, Orn. Eur. 1849, ii. 232.

Tringa (*Tringa*) *pectoralis*, Bonaparte, Spec. Comp. 1827, 62.

Pelidna (*Pelidna*) *pectoralis*, Bonaparte, Cat. Met. 1842, 60.

Tringa (*Actodromas*) *maculata*, Cassin, Gen. Rep. Birds, 1858.

Sp. Ch.—Bill a little longer than the head, about equal to the tarsus or middle toe, moderately stout, straight or very lightly decurved, the tip more expanded and punctulate than in the type of the genus. Grooves in both mandibles long and deep. Wings long, pointed, first primary decidedly longest; tertials very long, narrow, and flowing. Tarsus equal to middle toe, both about equal to the bill. Tail rather long, deeply doubly emarginate, the central feathers pointed and greatly projecting. *Adult in Spring.* An ill-defined white line over the eye, and a more distinct one of dusky between eye and bill. Crown streaked with brownish black and light chestnut, conspicuously different from the neck behind, which is streaked with dusky and light ochreous. Upper parts generally, a very dark brownish black, every feather edged with ashy or dark chestnut red, brightest on the scapulars, the tips usually lighter, and the margins never making deep indentations toward the shaft. Rump and upper tail coverts black, the outer series of the latter white, with sagittate spots of dusky. Primaries deep dusky, almost black, the shaft of the first white, of the others brown. Secondaries and greater coverts dusky, edged and tipped with white. Lesser coverts dusky, fading into light greyish ash on the edges. Central tail feathers brownish black, lighter on the edges, the lateral light ashy margined with white. Jugulum and breast with a deep wash of ashy brown, and with very numerous well defined streaks of dusky; the suffusion extending on the sides under the wings to some distance, where the dusky streaks are mostly shaft lines. Chin, and under parts generally, white, immaculate. Bill and feet dusky greenish. *Young in September.* Edges of the feathers of the upper parts generally, and of the tertials and central tail feathers, light bright chestnut, and the tips pure white. Lesser wing coverts broadly edged and tipped with light ferruginous. Suffusion on the breast and jugulum with a yellowish ochreous tinge not seen in the adult, and the streaks less distinct. Other parts as in the adult.

Length 9 to 9·5 inches, extent about 18, wing (average) 5·5. Bill, tarsus, and middle toe about 1·10.

Habitat.—Entire temperate North America. Europe.

This is the largest of the species of this group inhabiting North America, with the exception of the *A. Cooperi;* and though it is subject to great variations both in size and color, is not easily confounded with any other. The size, the character, and color of the margins of the feathers of the upper parts, the crown conspicuously different from the hind neck, and the deep pectoral wash, readily distinguish it. Its relationships are closest with the *A. Bairdii*, both having the black rump and upper tail coverts, and suffusion on the jugulum. The considerably superior size of the present species, however, at once distinguishes it, independently of the different color and pattern of the markings on the upper parts. In *maculata* the edgings of the feathers are either dull ashy or bright chestnut, and are never of the light reddish yellow of *Bairdii*. There is nothing of the scolloping of the edgings on the scapulars, which in *Bairdii* give the appearance of a rounded black spot on the end of each feather. The emargination of the tail is more than twice as great. The pectoral wash is much deeper, and the streaks more numerous and distinct. The much smaller size, the white upper tail coverts, and absence of a decided pectoral wash of *A. Bonapartei* at once separate that species without further comparison. The similarity in every respect except with regard to size presented by the *A. minutilla* is very great, especially in immature individuals of the latter; but its diminutive size renders

comparison unnecessary. The differences between the present species and the *A. Cooperi* will be pointed out under the head of the latter.

In addition to the characters given on the diagnosis, the following remarks may serve to illustrate the peculiarities of the present species, with its variations. While the difference in size between the largest and smallest specimens before me is very considerable, amounting to over half an inch in the wing, and more than an inch in entire length, the bill and feet vary but little in length and proportion. The difference in the length of the bill is but about one-tenth of an inch, and of the tarsus and toes it is less. The three are about equal, and from 1·10 to 1·20 of an inch in length. The proportions of the quills seem constant, the first being decidedly longest. The tertials vary quite remarkably in length, in some specimens nearly equalling the longest primary, and in others being over an inch and a half shorter; they usually, however, reach to within less than an inch of the tips of the wings. The feathers, which encroach on the side of the lower mandible but little beyond those on the upper, present an acute angle, their upper outline being parallel with the commissure, and the lower sloping rapidly backward. The crown is much darker than the hind neck, the transition being marked and abrupt. The upper parts vary greatly in the color of the margins of the feathers, it being of every intermediate shade from a very dull ashy with scarcely a tinge of reddish to very bright chestnut. In the latter case, the tips of the feathers are nearly pure white; but this pattern of coloration is mostly confined to the young bird, which, as is also the case with *A. minutilla*, is of actually brighter colors than when adult. An evidence of immaturity is always to be seen in the light ferruginous edgings of the lesser wing coverts, which in the adults are merely light ashy. The same feature characterizes the young *minutilla*, and is also found in the European *A. minuta*. While the pectoral wash is always deep and decided, its color varies considerably. In the adults it is usually a very dark ash, while in the young of the year it has a light ochreous or buff tinge. In the former it fades gradually into the white of the chin, while on the latter it forms a well defined more or less triangular white patch. The line of demarcation on the breast is always sharply defined. In some specimens there are dusky shaft lines along the sides quite to the vent. This species also sometimes exhibits the peculiar dusky state of plumage found in the *minutilla* and *Bairdii*.

Contrary to the general rule among the Sandpipers, there has been very little confusion among authors with regard to this species, and its synonomy is definite and well ascertained. The first notice of it by an American author was in 1823, in Long's expedition to the Rocky Mountains, where it was named *Pelidna pectoralis*, by Say. This specific appellation, certainly a most appropriate one, is that which has been in general use among authors, the bird being as usual referred to both *Pelidna* and *Tringa*. It is, however, very different from either, and is in every essential a true Actodromas. "Le tringa maculé," *Tringa maculata* of Vieillot, (1819,) unquestionably refers to the present species, and the name has therefore priority over *pectoralis*. Lichtenstein, in 1823, named the species *T. campestris*, which of course is also superseded by *maculata* Vieill. Degland, in 1849, presented the bird as *Tringa dominicensis*, the name being derived from the *T. cinclus dominicensis* of Brisson, (1760.) This author, however, was no binomalist, and has hence no claim to bestow names in such a system.

Actodromas (Heteropygia) Bonapartei (Schl.) Cass.—Bonaparte's Sandpiper.

? Scolopax pusilla, Gmelin, Syst. Nat. 1788, i. 663.
Pelidna cinclus, var. Say, Long's Exped. 1823, i. 172.
Tringa Schinzii, "Brehm." Bonaparte, Syn. 1828, (nec Brehm. quæ *T. alpina*, var. ? fide Gen. Rep.) Swainson. F. B. A. 1831, ii. 384. Bonaparte, Am. Orn. 1833, iv. 69. Nuttall, Manual, 1834, ii. 109. Audubon, Orn. Biog.

1833, iii. 529, tab. 278 ; id. Synopsis 1839, 236 ; id. Birds Amer. 1842, v. 275. Macgillivray, Man. Brit. Orn. 1842, ii. 72. Giraud, Birds L. I. 1844, 241. Dekay, N. Y. F. 1844, 241, tab. 84, fig. 191. Degland, Ornith. Europ. 1849, ii. 231. Lambeye, Aves Cubæ, 1850, 98. Woodhouse, Sitgreave's Exped. 1853, 100. Meyer, Brit. Birds, 1857, v. 96.

Pelidna Schinzii, Bonaparte, Comp. List. 1838, 50 ; id. Cat. Met. 1842, 60.

Tringa Bonapartei, Schlegel, Rev. Crit. Ois. Eur. 1844, 89.

Tringa (*Actodromas*) *Bonapartei*, Cassin, Gen. Rep. 1858, 722.

Sp. char. Bill quite stout, moderately long, equal to the head or tarsus, the tip somewhat expanded. Grooves on both mandibles long and deep. Feathers extending on the lower mandible but little beyond those on the upper. Wings long, pointed, first primary decidedly longest ; tertials long, narrow and flowing. Tail moderate, quite deeply doubly emarginate, the central feathers somewhat pointed and considerably projecting. Tarsus rather longer than the middle toe. Toes long, slender and slightly margined. *Adult in breeding plumage.*—Crown and upper parts generally light brownish ash, each feather with a large field of dusky towards its end, and on the crown and middle of the back edged with light yellowish red, deepening into bright sienna on the scapulars. Lesser wing coverts dark brownish ash, fading into light ashy on the edges, and with shaft lines of blackish. Secondaries and greater coverts light greyish ash, edged and tipped with white. Tertials very dark brownish ash, fading into light ashy on the edges. Primaries deep dusky, their shafts white in the central portions, and the innermost edged with white. Rump brownish black. Upper tail coverts white, their outer series with sagittate spots of dusky. Central tail feathers deep brownish black, the rest very light greyish ash, broadly edged and tipped with white. Jugulum and breast with a scarcely appreciable wash of very light ashy, with very numerous, distinct, linear-oblong streaks of dusky brown ; these extend as minute dots nearly or quite to the bill, and as narrow shaft lines, along the sides to the vent. Rest of under parts white, immaculate. Lower mandible flesh colored for half its length ; rest of bill, with the legs and feet, black. *Young in August.*—Upper parts a nearly uniform dark ash, the black of the adults showing at intervals, but principally on the scapulars, where also the reddish margins of the feathers are apparent. Jugulum and sides under the wings with an ashy suffusion, more conspicuous than in the adult, but much more restricted, and the streaks more obsolete and indistinct. Central pair of upper tail coverts usually dusky. Other parts as in the adult.

Length 7·5, extent 15, wing 4·8 inches. Bill, tarsus and middle toe rather less than one inch.

Habitat.—North America, east of the Rocky Mountains. Europe.

The preceding diagnosis would characterize the species sufficiently well for all ordinary purposes ; but in view of the great confusion which exists among authors, most of whom refer it to a very different bird, a somewhat extended account of its markings and variations appears necessary. A very perfect male, in breeding plumage, from Great Slave Lake, and an immature specimen of the same sex, obtained in Labrador during the month of July, are considered as respectively representing the adult and young, and taken as standards of comparison.

Adult.—The bill, which is quite stout, and somewhat expanded at the tip, rather less than an inch in length, and about equal to the head or tarsus. It is pretty constant, the difference in length between the longest and shortest billed specimens before me not exceeding the tenth of an inch. The lower mandible is flesh-colored for nearly half its length. The feathers extend on the side of the lower mandible but little if any beyond those on the upper, and their encroachment between the rami is not great. There is a white stripe over the eye, and a dusky one between the eye and nostrils, but both are very illy defined. The general color of the upper parts is a light brownish ash ; but on the back the feathers have such large blackish central fields, and so conspicu-

ously reddish margins, that the original color is seen only on the rather broad tips of the feathers. On the scapulars the reddish deepens into bright sienna, which borders the feathers evenly, showing little or no disposition towards the scolloping so conspicuous in *Bairdii* and *minutilla*. Some of the scapulars, however, are simply bordered with the prevailing ashy, and all are tipped with it. The long narrow tertials are sooty brown, fading into ashy on the edges. The secondaries and greater coverts are greyish ash, the former much the lighter, both edged and broadly tipped with pure white. The lesser coverts are dusky brown, edged with lighter. The primaries are dusky, nearly black on their outer vanes and at the tips, their shafts brownish at base, gradually fading into pure white, which again darkens with black at the tip. The innermost primaries are quite conspicuously edged with white. The rump is dark sooty brown.. The upper tail coverts are white, the outer series with sagittate dusky spots. The central tail feathers are sooty black, with narrow lighter margins; the rest a very clear light ashy, margined and tipped with pure white. The under parts are white; the throat, jugulum and breast with a scarcely appreciable wash of very light ashy, and very thickly streaked with well defined, narrow, linear-oblong marks of brownish black. These streaks, reduced to their minimum, extend as minute points nearly or quite to the bill, and, chiefly as narrow shaft lines, extend along the sides under the wings to the tail coverts, the dusky spots on the upper being the continuation of them. The other under parts are pure white and immaculate. The legs and feet are black.

Young.—The young differs very materially from the adult. The upper parts generally are of a nearly uniform dark greyish ash, the feathers with scarcely lighter margins. The black central fields and the reddish margins soon appear at irregular intervals, giving to the upper parts a more or less variegated appearance. The reddish is seen mostly on the scapulars. The wings and wing coverts are exactly like those of the adults, in this respect showing a remarkable deviation from the usual rule among the species of this genus, where an evidence of immaturity is to be found in the light ferruginous edgings of all the lesser wing coverts.* The central pair of the upper tail coverts are wholly dusky, and, in addition to the sagittate spots on the outer series, the intermediate ones are sometimes marked in the same manner. The wash on the jugulum is considerably more conspicuous than in the adult, but at the same time it is much more restricted, and the streaks are fewer and very indistinct. It extends, however, along the sides much as in the adults. This state of plumage is identical with that exhibited by the *Tringa alpina* at the same age in all respects, except those of the reddish lesser wing coverts and black upper tail coverts of the latter species. Though the adults of the two species are very different, this close resemblance of the young was probably one cause of the two birds being confounded by American writers. Between the plumage of the adult and young, as characterized above, there are to be found birds of every intermediate stage. A specimen shot in the middle of August has already the markings of adult and young in nearly equal proportions, while a winter specimen agrees in almost every respect with the adult in breeding plumage described above. This species is also found in the peculiar dusky state of plumage, where all the features are very dark and scarcely relieved by ashy or reddish margins, already adverted to in the case of *Actodromas maculata*, *Bairdii* and *minutilla*. It is most probable that all the species of the genus are liable to this curious variation.

The relationships of this species are decidedly closest with the *A. Cooperi*, both having clearly the same form, and the pattern of coloration being very similar. The greatly superior size, however, of the latter, independently of the variegated upper tail coverts, different character of the spots beneath, and other

* The same feature is seen in *Pelidna alpina* and *Americana*, a circumstance which would seem to indicate that the two genera are closely allied, as is indeed the case.

features, at once separates it without need of a more extended comparison. The larger size, pectoral wash, and black rump and upper tail coverts of *A. maculata*, at once distinguishes it, while the very diminutive proportions of *A. minutilla* render comparison equally unnecessary. Its relationships to the *A. Bairdii* have already been discussed.

It is a little extraordinary that with regard to so marked and well characterized a Sandpiper as the present, there should have arisen the confusion which until recently has prevailed among authors, nearly all referring it to a very different bird. To use the apt and expressive words of the General Report, it has been "sadly misnamed by American ornithologists." When in mature plumage it bears very little resemblance to the *Tringa Schinzii*, Brehm., which, according to the same authority, is "merely a smaller variety, or perhaps only smaller specimens of the common *Tringa alpina* ——." This grave error probably originated from two causes: first, that Say, in his original description (the first notice of the bird by an American writer) designates it as *Pelidna cinclus*, var.; and secondly, that though the adults are as different as possible, the young of the two, as already stated, are nearly identical in plumage, almost the only difference lying in the proportions of the bill and feet; characters which, though important and essential, might readily be overlooked in birds of this group, in which the colors were similar. This similarity in the young and great difference between the adults of the present species and the *Tringa alpina*, var., caused Bonaparte, in his American Ornithology, to fall into a curious error. Under the head of *Tringa Schinzii*, Brehm., he describes the present species accurately, properly quoting the *Pelidna cinclus*, var. of Say; yet only the description of what he considered as the young "*T. Schinzii*" applies to the *A. Bonapartei*. For, speaking of the adult, he says: "This Sandpiper is well known to appear in a summer vesture analogous to that of *Tringa alpina*, at the same season, *but we have never met with an American specimen in that state;*" and further on he describes adult *European* specimens as having "the breast almost entirely of a jet black color," clearly referring to the so-called *Tringa Schinzii*, *i. e.*, to the smaller variety of the *T. alpina*. Nuttall, probably following Bonaparte, commits precisely the same mistake. Audubon's *Tringa Schinzii* is undoubtedly the present species, though the measurements given are rather those of *A. Bairdii;* and, for reasons stated elsewhere, I am inclined to think that his figure of the male was taken from an individual in the peculiar abnormal dusky state of plumage already so often adverted to. The descriptions of *Tringa Schinzii* by other American authors, and by those European writers quoted in the list of synonyms, all appear to refer to the true *Bonapartei*.

The description by Schlegel, in 1844, of *Tringa Bonapartei*, unmistakeably points to the present species, and, as it is the first distinctive specific appellation, must be employed. Parzudaki, in his Catalogue, very wrongly gives *Bonapartei*, Sch., as a synonym of *Pelidna maculata*, (*pectoralis* of Say.) *Scolopax pusilla* of Gmelin is in all probability the present bird, as particular mention is made of the white upper tail coverts; but from the brevity of the description, it is impossible to determine this point satisfactorily.

ACTODROMAS (HETEROPYGIA) COOPERI (Baird) Coues.—Cooper's Sandpiper.

Tringa Cooperi, Baird, Gen. Rep. 1858, 716.

Sp. char. Largest of the group. Bill considerably longer than the head, exceeding the tarsus, straight, rather stout, tip scarcely expanded. Feathers extending on side of lower mandible scarcely further than those on the upper. Wings long, pointed, first primary decidedly longest; tertials moderately long and rather slender. Tail moderate, slightly but decidedly doubly emarginate, the central feathers projecting. Tarsus rather longer than the middle toe; tibia bare for half the length of the tarsus; toes all long, slender and slightly margined. *Adult in spring.*—Upper parts a nearly uniform light greyish ash,

each feather with a central brownish black field, deepening into pure black on the scapulars, where also the edgings of some of the feathers have a reddish tinge. Tertials sooty brown, fading with light ashy on the edges. Secondaries and greater coverts dark greyish ash, edged and broadly tipped with white. Primaries deep dusky, almost black on the outer vanes and at the tips, the innermost edged with white; shafts of all brown at base and black at tip, the central feathers being white. Upper tail coverts white, with sagittate spots of dusky. Tail feathers ashy brown, the central pair darkest. Under parts white; the jugulum, breast, and sides of the neck with a slight reddish tinge, and, together with the sides, with numerous streaks and oval spots of dusky, which become large and V-shaped on the flanks.

Length (of skin) 9·5 inches; wing 5·75, tail 2·80, bill above 1·23, tarsus 1.14 middle toe 1.

Habitat.—Long Island.

In order to exhibit more fully the features and peculiarities of this curious Sandpiper, differing in many essential respects from any other described as North American, the following additional remarks may be required, that we may be better enabled to judge of its relationships and affinities, which are matters of some uncertainty. The characters are taken from the type of the species, the original of the description in the General Report.

The bill and feet though rather stout for an *Actodromas*, are slender in comparison with *Tringa*. The tip of the former is but slightly expanded, and rather obtuse. The grooves in both mandibles are long and distinct, that of the lower being narrow but deep. The position of the nostrils is nearly intermediate between *Tringa* and *Actodromas*. The nature of the encroachment of the feathers on the bill is identical with that of *A. Bonapartei*, and very different from that of *Tringa*. The wings are long and pointed, the first primary much the longest, as in *Tringa canutus*, and the graduation of the others exactly as in that species. The tertials are rather long, narrow, and flowing. The emargination of the tail, though not great, is decided; the central feathers project a little beyond the others, but are not much darker than the others; the outer pair are next in length, and the third are the shortest. The legs and feet are long and comparatively slender. The tibiæ are long and much denuded, the bare portion being nearly two-thirds the tarsus. The latter is rather shorter than the bill, but at the same time slightly exceeds the middle toe and claw. The toes are all long, slender and slightly margined, and the hind one is well developed. The coloration of the upper parts is very different from that of *T. canutus*, and exceedingly similar to that of *A. Bonapartei*, almost the only difference being a rather less amount of reddish on the back. The rump and upper tail coverts are much the same as in *T. canutus* being white, with sagittate spots and waved bars of dusky. The pattern, and colors of the under parts, though agreeing with *A. Bonapartei* in the absence of a decided pectoral wash, are yet very different, the spots being sparse, and extending over the whole breast, instead of being very numerous and confined strictly to the jugulum and sides. In this respect it approaches the young *Tringa canutus* or still more the adult *Ereunetes pusillus*, the similarity being heightened by the slight reddish tinge on the jugulum.

Having thus presented the chief peculiarities of this very unique Sandpiper, we are prepared to discuss the question of its affinities. Were the size and proportions of bill, tarsus, and toes the same as in the *A. Bonapartei*, it might almost be a question whether it were not an accidental variety of that species; but the discrepancies in these particulars are too great to admit the doubt. The differences from all other species are sufficiently obvious. Granting, then, that it is a distinct bird, it only remains to settle the question of its generic relationships; which, as it presents a most remarkable combination of the characters of both *Tringa* and *Actodromas*, is a matter of some uncertainty. We cannot but think, however, that all the most important characters of the bird incline

towards *Actodromas*, rather than to *Tringa*, and that *A. Bonapartei* is its nearest ally. While the actual proportions of the bill, tarsus, and toe of *Tringa* are preserved, the difference in length of the bill over the tarsus, and of the latter over the middle toe, is very trifling, and in the latter case, moreover, it is produced by a slight lengthening of the tarsus rather than by any shortening or stoutening of the toes, which are long, slender, and slightly margined as in *Actodromas* proper. The claws are all long, slender, and slightly curved, while exactly the reverse is the case with *Tringa*. The tibiæ are bare for a considerably greater extent, and the tibial feathers short. In the adults of *Tringa* these reach nearly to the joint. In the slight (though decided) double emargination of the tail, with its central feathers, but little different from the lateral, and in the pattern of the rump and upper tail coverts, there is shown a near approach to *Tringa*. The primaries are as in *Tringa*, but the elongated tertials are those of *Actodromas*. The stoutness of the bill and the position of the nostrils, are intermediate between the two, but the encroachment of the feathers is exactly that of *A. Bonapartei*. The coloration of the upper parts, except of the rump, is almost identical with that of *Bonapartei*, and that of the lower much nearer to it than to the adult *T. canutus*.

From the above considerations, especially in reference to the indications afforded by the legs, always important among the *Tringeæ*, we cannot but conclude that the bird is *Actodromas*, rather than a true *Tringa*. Still we should hardly have ventured to change it from the position assigned by such high authority, had not Prof. Baird, in an attentive rëexamination of the characters of the bird, acquiesced in our views, and expressed his entire approval of the course pursued.

In view of the many peculiarities presented, it might perhaps have been advisable to consider the present bird, instead of the *A. Bonapartei* as typical of *Heteropygia*. But as the two are very closely allied, and both subgenerically distinct from *Actodromas* proper, we have preferred to give the common and well known bird as the type.

The subject of the present article, is, with a single exception, we believe, the only known specimen of this excessively rare species. It is fortunately adult, having been taken in May. The changes of plumage it undergoes, and the extent of the variation to which it is subject, cannot therefore be given. They are, however, in all probability parallel with those of *A. Bonapartei*.

"It is possible that this species may have been previously indicated under some of the names quoted as synonyms, such as *Tringa noveboracensis*, &c., although, from the brevity of the descriptions, it is impossible to determine this point satisfactorily."—(Baird.)

Having thus passed in review the species of *Tringeæ* well ascertained to inhabit North America, it may be well to notice those attributed by authors to that country. As far as I am able to ascertain they are the following:

Actodromas minuta Kaup.

Tringa pusilla, Meyer. (Nec Linn.; nec Bechst.; nec Wils.)
Tringa minuta, Leisler. Swainson, F. B. A. 1831, ii. 385. Nuttall, Manual. 1834, ii. 119.

It is not impossible that this species should occur in North America, or that there should exist a "Pigmy" Sandpiper distinct both from the *A. minutilla* and the European species. Observation, however, does not as yet warrant the belief that such is the case.

Actodromas Temminckii Bon.

Tringa pusilla, Bechstein. (Nec Linn.; nec Meyer; nec Wils.)

Tringa Temminckii, Leisler.
Leimonites Temminckii, Kaup.
Tringa pusilla, "Linn." Nuttall, Man. ii. 1824, 117. (Nec Linn.)

This species, a specimen of which we have never had the pleasure of examining, is given by Nuttall as an inhabitant of North America, though in all probability upon insufficient or erroneous data.

LIMICOLA PYGMÆA, Koch.

Numenius pygmæus, Latham.
Tringa eloriodes, Vieillot, fide Parzudaki.
Tringa platyrhyncha, Temminck. Nuttall, Man. 1834, ii. 114.

This marked and very curious Sandpiper is stated by Nuttall to be "of very rare occurrence in the United States." I have never seen an American specimen, and its existence in that country must be considered as extremely doubtful.

In addition to the above, nearly all the short-billed species of *Totaninæ* were considered by the older authors as *Tringeæ*. *Tringa rufescens*, Vieill. of authors, though given as a *Tringa* as late as 1842, by Audubon, is in all essentials a true Tatler, and very closely related to *Actiturus*, Bonaparte.

August 6th.

Vice President BRIDGES in the Chair.

Thirteen members present.

The death of Dr. George Spackman, a member, at Philadelphia, on the 3d inst., aged 56, was announced.

On leave granted, the Committees appointed on the papers by Messrs. Abbott, Elliott and Coues, read in July, were permitted to report, and the papers were ordered to be printed in the Proceedings for July.

August 13th.

Dr. LEIDY in the Chair.

Nine members present.

The following papers were presented for publication:

"On three new forms of Rattlesnakes," by Robert Kennicott.

"Notes and Descriptions of Anoles," by E. D. Cope.

"Notes on the Ornithology of Labrador," by Elliott Coues.

August 27th.

Dr. LEIDY in the Chair.

Twelve members present.

On report of the respective Committees, the following papers were ordered to be published in the Proceedings:

On three new forms of Rattlesnakes.

BY ROBERT KENNICOTT.

Caudisona lepida *Kennicott.*

Spec. char. Head ovoid, tapering to the nose, which is very narrow, pointed and much depressed. Nostril very small, circular and placed near the point of the nose in about the middle of a single nasal. Two elongated frontals in contact, extending behind the nostrils. Superciliaries and other large plates smooth. Rostral sub-triangular, broader than high, the apex turned back slightly upon the crown. Upper pre-orbital small and separated from the post nasal by the width of two larger plates. Labials rather large, 12 above 10—12 below. Color of head yellowish ash.

Two heads of a rattlesnke from Presidio del Norte and Eagle Pass show such remarkable features as to render it justifiable to describe the species from these alone.

The head is much depressed, the general outline ovoid, tapering regularly from about opposite the angle of the mouth to the nose. The crown is remarkably smooth and the occipital scales very faintly carinated. There are two large frontals elongated laterally and posteriorly, with their inner ends in contact. They are convex on their external, and concave on their internal edges, and extend for nearly half their length back of the nostril. Behind and fitting into the emargination formed by these, are two subquadrangular and smaller plates in contact; immediately behind these is another similar pair. On each side of these two last pairs, at the edge of the crown, between the superciliaries and anterior frontals, is a larger plate. The superciliaries are rather small, and, like the other larger plates quite smooth; the space between the superciliaries is narrow, and filled with irregular rather large scales; the posterior part of the crown is also covered with rather large and smooth scales. The pre-orbitals are remarkable; the lower is, as usual, small and elongated over the pit, but the upper, very small and quadrangular, is separated from the nasal by the length of two plates, each larger than itself. In all the other species the upper pre-orbital is large, more or less elongated and in contact with the post nastal or only separated from it by the width of one smaller plate. The sub-orbital chain is complete, and there is only a single row of scales between it and the labials. The color of the head is uniform yellowish or light brownish ash without any distinct spots or stripes, though each plate is minutely mottled with brownish, and with a few scattering large black dots, and there is very faint indication of the usual posterior facial stripe extending over the angle of the mouth.

The body of this species will doubtless exhibit characters as important as those of the head. It will at once be distinguished from C. molossus and C. tigris by the single nasal, position of pre-orbitals, number and comparative size of labials, and number of rows between the sub-orbitals and labials, and by the narrow pointed nose instead of the broad blunt snout of C. molossus and C. tigris. It disagrees also with C. lucifer in all of the above characters, excepting the size of labials and the narrow nose, and differs widely from that species in the depressed snout, wide rostral, and perfectly smooth plates and scales on the head. By the smoothness and size of the plates, and absence of the horn, it will at once be distinguished from C. cerastes. It will be impossible to confound it with any of the eastern species.

Caudisona atrox *Cope.* Var. Sonoraensis *Kennicott.*

Specimens from Sonora and vicinity show some permanent differences from the more eastern types; and, though the differences detected as yet are thought too slight to characterize a distinct species, subsequent researches with the aid of better material will very likely prove the western type to be

[Aug.

tail, with crescentic marks upon the nape, as in Varanus niloticus, and light and dark variegations upon the front and chin, (Smiths. No. 5742¼.)

Specimens (adults, No. 5738) in Mus. Smithsonian, from Monte Verde, Cuba, Mr. C. Wright discoverer; also Mus. Acad. Nat. Sciences. This interesting species resembles somewhat the form of A. (?) carolinensis, from Cuba. In specimens of that species of very small size the facial rugæ are prominent, the frontal scales much more numerous, and those of the back and belly keeled. The breadth between the orbits greater in isolepis, and the auricular aperture smaller. In the oviduct of the female was found a single large egg. Observations upon numerous species of Anolis, incline me to adopt the suggestion of Dr. Günther, viz., that but one egg at a time is impregnated and excluded.

Xiphocercus Valencienii *Fitz.*, Syst. Rept. 1843. *Anolis Valenciennii* Dum. Bibr., Erp. Gen. iv. 131, 1837. *Placopsis ocellata* Gosse, Ann. Mag. N. H. 1850, p. 346. *Anolis leucocephalus* Hall., Proc. A. N. Sci. Phil. 1856, p. 228.

The genus first defined by Mr. Gosse, as above, though previously named by Fitzinger, is to be separated, in our opinion, not so much on account of the *size* of the plates of the front, but by reason of their curious homology with those of the plate headed Lacertidæ and Scincidæ, which is readily traced. In the tail, and nature of the dermal covering, it resembles Eupristis; in the form of the head it imitates Anolis iodurus, and opalinus most closely. It is interesting to observe that both these species, and Eupristis Edwardsii, *Cope*, inhabit with it the island of Jamaica.

Notes on the Ornithology of Labrador.

BY ELLIOTT COUES.

During the summer of 1860 I accompanied an expedition in charge of J. W. Dodge, Esq., which visited the coast of Labrador, in order to procure for the Smithsonian Institution specimens of the birds to be found there, together with their nests and eggs, and to study their habits during the breeding season. The late period of arrival upon the coast, which was not until the first week in July, prevented any very extensive operations in the department of Oology, while the nature of the localities visited, joined with some circumstances of a private character, rendered the formation of a large collection of birds impracticable. In the following pages, however, are embodied the results of my investigations; and though the list of the species noticed is, from my limited opportunities for observation, necessarily incomplete, it is hoped that it will not be found entirely wanting in points of interest with regard to the habits of the birds which pass the breeding season in Labrador.

A brief notice of the different localities which were visited may not be considered unnecessary. The first point reached was Sloop Harbor, a few miles south of Little Mecattina, where were collected most of the eggs procured during the voyage. Here the *Somateria mollissima* and the *Utamania torda* were the most abundant and characteristic birds, while the *Larus argentatus*, *Uria grylle*, and *Mergus serrator* were also very numerous, all breeding on the islands in the vicinity. On the 6th of July, the vessel left Sloop Harbor, and, passing the Murre Rocks, where the *Uria lomvia* was breeding in immense numbers, proceeded directly to Esquimaux Bay, where the greater part of the summer was spent. Here were collected most of the land birds procured, among them the new *Aegiothus fuscescens*. *Zonotrichia leucophrys*, and *Anthus ludovicianus* were very abundant; and *Pinicola Canadensis* and *Turdus Aliciæ* not rare. Grouse and Ptarmigan were also met with; and I was fortunately enabled to examine an extensive breeding place of the *Mormon arcticus* (?).

A few days were spent at Rigolet, a station of the Hudson Bay Company, in

charge of Henry Conolly, Esq., from whom were received some valuable meteorological statistics. On the 15th of August the vessel left Esquimaux Bay, and proceeded to Henley Harbor, at the northern entrance to the Straits of Belle-Isle. At that date the smaller waders generally had commenced their southern migration, and during two weeks spent there, which completed my stay on the coast, specimens of most of them were procured.

In the preparation of the following pages, I have not attempted to present the synonymy of the species, nor their diagnoses. To do so would be but to repeat what may be found in full in the General Report on Birds, by Baird, Cassin and Laurence, (vol. ix. P. R. R. Exp. and Surv.) Reference is therefore made to the pages of this work; and also to Audubon's Birds of America, the standard authority on the habits of the birds, where the further history of each species will be found fully elucidated. The names and authorities adopted are strictly those of the General Report, except in a few cases where some change appeared necessary, from the characters of the birds entitling them to full generic rank.

Falco (Hypotriorchis) columbarius Linn.—Pidgeon Hawk. "Sparrow Hawk."

Falco columbarius, Aud., Birds Amer. vol. i. page 88, pl. 21.
Falco (Hypotriorchis) columbarius, Cassin, Gen. Rep. page 9.

The Pidgeon-hawk I met with on but two occasions. On the 5th of August, while on a small rocky island in Groswater Bay, one was seen circling in the air at a moderate height, and constantly uttering its loud harsh cries; but owing to its watchfulness, I could not secure it. On the 25th of the same month, at Henley Harbor, another individual was seen, foraging among the immense flocks of Curlews, (*Numenius borealis*), which then covered the hills in the vicinity. The Pidgeon-hawk is occasionally stuffed and offered for sale by the natives; and from their accounts I should judge it to be not at all rare. It is known to them as the "Sparrow-hawk," by which name, however, they also designate the *F. sparverius*.

On the return voyage, when more than a hundred miles from any land, a Pidgeon-hawk made its appearance, and after circling about for some time, to select the safest place on which to alight, at length settled on the outermost bowsprit rigging, apparently quite exhausted. Yet even in this worn-out condition so watchful was it, that on my levelling a glass at it, it instantly took flight and disappeared.

Falco (Tinnunculus) sparverius Linn.—Sparrow Hawk.

Falco sparverius, Aud., Birds Amer. vol. i. p. 90, pl. 22.
Falco (Tinnunculus) sparverius, Cassin, Gen. Rep. p. 13.

But a single individual of this species, so abundant in most portions of the United States, was observed during my stay in Labrador. On the 10th of September, however, while in the Gulf of St. Laurence, off the Isle of Cape Breton, several were seen during the day. They circled quite closely around the vessel, showing but little fear.

? Falco (Hierofalco) Islandicus Gmelin.—Gyr Falcon. "Speckled Hawk."

? Falco Islandicus, Aud., Birds Amer. i. 81, pl. 19.
? Falco (Hierofalco) Islandicus, Cassin, Gen. Rep. 13.

I had not the good fortune to obtain, or even meet with, either species of Gyr Falcon. The hunters with whom I conversed on the subject, said that they were seldom seen in the summer, but that they become more abundant in the autumn and winter. They were represented as at all times very shy and difficult to procure, frequenting the highest and most inaccessible crags, and subsisting mainly on Grouse and Ptarmigan. I could not, of course, determine from these accounts whether *F. Islandicus* or *candicans* was referred

[Aug.

to; but the habits of both are probably exceedingly similar, if not identical. They are known to the natives under the name of "Speckled-hawks."

ASTUR ATRICAPILLUS (Wils.) Bon.—Goshawk. "Partridge-hawk."

Astur palumbarius, Aud., Birds Amer. ii. 95, pl. 23.
Astur atricapillus, Cassin, Gen. Rep. 15.

I obtained a single specimen of this hawk, in immature plumage, from a small collection of skins offered for sale by the natives. They know it as the "Partridge-hawk," but further than this I learned nothing respecting it. It does not appear to be abundant.

ARCHIBUTEO SANCTI-JOHANNIS (Gm.) Gray.—Black-hawk.

Archibuteo Sancti-Johannis, Cassin, Gen. Rep. 33.

While at Puffin Island, on Groswater Bay, I twice saw a large hawk that I supposed to be this species. It was hovering at a great height over the island, and constantly uttered its loud, piercing screams. I was unable to secure this specimen, which was the only one I observed during my stay in Labrador.

AQUILA CANADENSIS (Linn.) Cassin.—Golden Eagle. "Grepe."

Aquila chrysætos, Aud., Birds Amer. i. 50, pl. 12.
Aquila Canadensis, Cassin, Gen. Rep. 41.

An intelligent hunter, whom I questioned concerning this Eagle, informed me that though he knew it well, it was very rare, and very seldom obtained. His description was so exact, that I had no difficulty in determining that the present species was referred to, and not the *Halliætus albicilla*, concerning which, though it may be found in Labrador, I could learn nothing. He applied to the *A. Canadensis* the name of "Grepe," or "Greep," the derivation of which word I was unable to ascertain.

BUBO VIRGINIANUS (Gm.) Bon.—Great Horned Owl.

Bubo Virginianus, Aud., Birds Amer. i. 143, pl. 39. Cassin, Gen. Rep. 49.

A single specimen of this bird which I saw at Rigolet, made me aware of its existence in Labrador. I learned nothing of its habits; which, however, in all probability, do not differ materially from those of the more southern bird.

PICOIDES ARCTICUS (Sw.) Gray.—Arctic Three-toed Woodpecker.

Picus arcticus, Aud., Birds Amer. iv. 266, pl. 268.
Picoides arcticus, Baird, Gen. Rep. 98.

I did not myself meet with any individuals of the Three-toed Woodpecker; but I saw a specimen in a collection of skins made by the natives. It is probably not rare in the interior.

CERYLE ALCYON (Linn.) Boie.—Belted Kingfisher.

Alcedo alcyon, Aud., Birds Amer. pl. 77
Ceryle alcyon, Baird, Gen. Rep. 158.

I ascertained the existence of this bird in Labrador, from a single skin in the possession of the natives. They considered it as a rare bird.

TURDUS (TURDUS) ALICIÆ Baird.—Grey-cheeked Thrush.

Turdus (*Turdus*) *Aliciæ*, Baird, Gen. Rep. 217.

I was not a little suprised to find this species breeding abundantly in Labrador, its habitat being given by its describer as "the Mississippi Region to

the Missouri."* On the 24th of July I came upon a family of these birds in a deep thickly wooded ravine. The young were apparently just commencing to fly. Both parents uttered constantly a rather melancholy "*pheŭyh*," in a low whistling tone. The female evinced the greatest anxiety for the safety of her brood, and endeavored to lead me from their vicinity by fluttering from bush to bush; and it was only with some difficulty that I secured both parents. In the course of the same day I saw several of these Thrushes, only, however, among the thickest firs. They all uttered precisely the same note, and were very timid, darting into the most impenetrable thickets, so that it was with great difficulty they could be procured. They appear to be very abundant in Labrador; probably full as much so as the *T. Swainsoni* in most portions of eastern United States.

There are readily appreciable characters by which this species may be distinguished from the closely allied *T. Swainsoni*. The uniformly longer, straighter, and narrower bill is a striking feature. The upper parts are of a much darker shade of olive, as are also the sides under the wings, and the spots on the throat and breast. But the most prominent feature is the entire absence of any buff tinge on the throat and sides of the head and around the eye, so conspicuous in *T. Swainsoni*. The whole bird is also considerably larger.

TURDUS (PLANESTICUS) MIGRATORIUS Linn.—Robin.

Turdus migratorius, Aud., Birds Amer. iii. 121, pl. 142.
Turdus (*Planesticus*) *migratorius*, Baird, Gen. Rep. 218.

The Robin, so common and well known throughout the United States, is equally abundant in all well wooded districts in Labrador. Its habits are so familiar to every one, that a detailed account of them would be superfluous. I remarked, however, that they appeared to be shyer than might be expected in a country where they are so seldom molested.

SAXICOLA ŒNANTHE Bechst.—Stone Chat.

Saxicola œnanthe, Baird, Gen. Rep. 220.
? *Saxicola œnanthoides*, Vigors, Zool. Voyage Blossom, 1839, 19. Cass. Ill. i. 1854, 208; pl. xxxvi.

I had the good fortune to procure a specimen of this interesting bird, at Henley Harbor, on the 25th of August. The sailor who brought it to me stated that it was in company with two others, but could give no intelligible account of its voice or manners. It was in immature plumage, very different from that of the adult, and was excessively fat.

The North American *Saxicola* has by some authors been considered distinct from the common European *S. œnanthe*, under the name of *S. œnanthoides*, first applied by Vigors to a bird from the North-west Coast. The author remarks upon its very close affinity to the European bird, and apparently considers the locality as the strongest ground for supposing a specific distinction. The name was subsequently applied by Cassin, in the work above cited, to a bird from Nova Scotia, the larger size and rather different proportions of the tarsus being with this author the most important characters. In a critical comparison of specimens from Europe, Greenland and Labrador, I have been unable to detect any distinctive features beyond those of size, and very slight differences of proportion; which last, however, are not constant, or greater than exist between undoubted specimens of *S. œnanthe*. The difference in size is no greater than would be expected from the more northern locality of the bird

*I have since detected this species at Washington, D. C.; and well characterized specimens have also been obtained in the same locality by my friend, Mr. D. W. Prentiss. This would seem to indicate an eastern range at least equal to that of *T. Swainsoni*, with which it is found associated, in the region west of the Mississippi.

examined. In the table of comparative measurements given below, it will be seen that the specimens from Greenland and Labrador are very nearly of the same dimensions, and also larger than European skins, though the details of bill, tarsus, &c., do not differ materially. It is not impossible that Vigor's bird should be distinct from the *S. œnanthe*, especially as the measurements,* if accurate, would indicate a bird of rather small dimensions for so northern a a locality; but at present I cannot but regard the Labrador bird as identical with the European. The question can only be definitely settled by a series of specimens from different localities in both continents.

Comparative Measurements.

No.	Locality.	Age.	Length.	Extent.	Wing.	Tail.	Bill above.	Along Gape.	From Nostril.	Tarsus.	Mid. Toe & Claw.	Hind Toe & Claw.
	Europe,.....	ad.	5·90†		3·73	2·45	·50	·80	·38	1·07	·82	.57
18958	France,.....	yg.	5·50†		3·73	2·30	·52	·79	·40	1·07	·87	.59
20551	Greenland,	yg.	6·20†		4·05	2·55	·49	·78	·40	1·10	·85	·58
18075	Labrador,..	yg.	7·00	12·6	4·05	2·55	·50	·79	·40	1·08	·83	·58

† of Skin.

Regulus calundula (L.) Licht.—Ruby-crowned Kinglet.

Regulus calendula, Aud., Birds Amer. ii. 168, pl. 133. Baird, Gen. Rep. 226.

A single specimen, a bird of the year, was obtained at Rigolet, on the 6th of August, shot in a very densely wooded ravine. No other individuals were observed. It is, however, in all probability an abundant bird in Labrador.

Anthus Ludovicianus (Gm.) Licht.—Tit-lark.

Anthus Ludovicianus, Aud. Birds Amer. iii. 40; pl. 150. Baird, Gen. Rep. 232.

The Tit-lark I found abundant in every locality in Labrador which I visited, and I had ample opportunities of observing its habits during the breeding season. It is the most numerous of the land birds, with the exception, perhaps, of the white-crowned sparrow, *Zonotrichia leucophrys*. Some of the most rocky and barren islands along the coast are inhabited only by these birds, with perhaps a solitary pair of horned larks, *Eremophila cornuta*. It frequents only open, bare, and exposed situations, such as the coast of Labrador every where affords, and is never found in thickly wooded localities.

Two nests which I obtained, were precisely identical in situation, form and construction. Each was placed on the side of a steep precipitous chasm, in a cavity in the earth of about the size of a child's head, into which a little dried moss had been previously introduced to keep the nest from the damp earth. It was composed entirely of rather coarse dried grasses, very loosely put together, with no lining of any sort. The external diameter was about six inches; the exterior three inches, by two in depth. The eggs were in one instance five, in the other four; their average length, for they varied somewhat, was thirteen-sixteenths of an inch, by nine-and-a-half-sixteenths of an inch in greatest diameter; of a dark chocolate color, indistinctly marked with numerous small lines and streaks of black.

The parent does not leave the nest until nearly trodden upon; then she flutters off with loud cries of distress which soon bring the male, though without attempting to lead the intruder from the nest by feigning lameness, as is the habit of so many birds. The pair together hover over the head of the in-

* "Length, 5⅛; wing, 3⅜; bill, rictus, ¾; tail, 2¼; tarsus, 1."

truder, at times approaching within a few feet, and all the while expressing their distress and anxiety by the most plaintive cries, until he withdraws; they even then frequently follow him for some distance. On such occasions several pairs in the vicinity are often attracted to the spot, and join their cries with those of the afflicted parents. Besides these cries, and their usual chirp, these birds have a much lower softer "*tsip;*" and the males during the breeding season have a very sweet, pleasant song.

The flight of the Tit-lark is performed in an unsteady undulating manner, and is not ordinarily protracted to any great distance. On alighting they rapidly vibrate the tail several times, in the manner of all the *Motacillinæ*. They seldom or never alight on trees or bushes, but always on the ground, where they walk or run with great ease and rapidity. They are fond of resorting at low tide, to the "land-washes," (as the low muddy flats over which the tide flows are styled in Labrador,) where they run about on the mud and dried "Eel-grass," (*Zostera*), searching for food in company with the smaller Sand-pipers, and very much in the same manner. Though finding an abundance of food, none that I examined were at all fat. They at all times exhibit a heedless familiarity and entire want of fear of man, though the observer may be standing within a few paces. They feed unconcernedly around the doors of the houses; and I have frequently seen them searching for food on the very roofs of the sheds and houses; which, being thatched with brush, and a layer of turf, afford a convenient lurking place for their insect prey.

DENDROICA PINUS (Wils.) Baird.—Pine-creeping Warbler.

Sylvicola pinus, Aud. Birds Amer. ii. 37; pl. 82.
Dendroica pinus, Baird, Gen. Rep. 277.

This, and the succeeding species were the only *Dendroicas* met with in Labrador. The single specimen of the Pine-creeping obtained was shot in very dense fir woods, on the 1st of August, and was a young bird apparently just able to fly.

DENDROICA STRIATA Baird.—Black Poll Warbler.

Sylvicola striata, Aud. Birds Amer. ii. 28; pl. 78.
Dendroica striata, Baird, Gen. Rep. 280.

This species I observed in every suitable locality, and was the only warbler I found abundant. It is very numerous in all well wooded situations, and is a most expert fly-catcher. On many occasions I saw it dart into the air in pursuit of flies, mosquitoes, and other insects, and return again to the same twig, in the manner of our common Wood Pewee, *Contopus virens*. This seems to be a more constant habit with this warbler, than with any other of its genus.

PARUS HUDSONICUS Forster.—Hudsonian Titmouse.

Parus Hudsonicus, Aud. Birds Amer. ii. 155; pl. 128. Baird, Gen. Rep. 395.

This species I met with on several occasions, always finding them associating in small restless companies. I experienced great difficulty in procuring specimens, owing to the dense nature of the firs they inhabit; for when in sight, they were always so near, that it was almost impossible to kill them without mutilation. Those procured were all young birds, exhibiting the markings of the adults very indistinctly. They were remarkably tame and familiar, hopping about unconcernedly within a few feet of my head, and hanging from the twigs in every conceivable attitude. I could discover little or no difference in their notes from those of the common Chickadee, *P. atricapillus*, to which they likewise exhibited a great similarity in their general manners, evincing the restlessness and activity so characteristic of the latter bird, and for which the whole family of *Paridæ* are so noted.

[Aug.

EREMOPHILA CORNUTA Boie.—Horned Lark. "Skylark."

Alauda alpestris, Aud. Birds Amer. iii. 44; pl. 151.
Eremophila cornuta, Baird, Gen. Rep. 402.

Very abundant on all the barren moss-covered islands along the coast, and in every suitable situation on the main land. Labrador, indeed, from the fact that it is the most southern region which affords the peculiar open and exposed situations which these birds exclusively frequent, seems to be their special breeding ground. In their voice, flight, and general manners I noticed nothing different from their usual habits, well known during their extensive southern migration, except that they of course do not associate in flocks during the breeding season. To the natives they are known by their usual name of "Sky-larks."

PINICOLA CANADENSIS (Briss.) Cab.—Pine Grosbeak. "Mope," "Redbird."

Corythus enucleator, Aud. Birds Amer. iii. 179; pl. 199.
Pinicola canadensis, Baird, Gen. Rep. 410.

The Pine Grosbeak I ascertained to be not at all rare along the coast of Labrador, where I obtained several specimens; and it is probably still more abundant in the interior. It is confined entirely to the thick woods and patches of scrubby juniper. It is not at all shy, rather evincing a heedlessness of the presence of man, that must arise from the fact that it is so seldom molested; still from the dense nature of the firs it inhabits, it is rather difficult to procure. The female of a pair I obtained sat unconcernedly on a twig only a few paces distant, while I reloaded after shooting her mate; uttering continually a low soft "*shep*," almost exactly like that of the common Fox Sparrow, *Passerella iliaca*. Another note which I occasionally heard was a prolonged whirring chirrup, uttered in a rather low tone, which appeared to be the usual note of recognition between the male and female. This bird is commonly known to the natives by the singular appellation of "Mope;" the derivation of which word I could not ascertain. It is also sometimes called the "Red-bird;" and it has in addition an Esquimaux name, which, however, I do not venture to attempt.

AEGIOTHUS Cabanis.

Syn. *Acanthis*, Bonaparte, Consp. Av. 540. Nec Bechst. 1802; nec Keys. et Blas. 1840.
Aegiothus, Cabanis, Mus. Hein. 1851, 161. Typus *Fring. linaria* L. Baird, Gen. Rep. 1858.

Gen. Ch. Size small. Crown with a crimson patch; the breast and rump tinged with rosy in the male. Bill short, rather slender, conical, and acutely pointed, the lateral outlines concave; culmen, gonys and commissure about straight. Upper mandible with several obsolete ridges parallel with the culmen. Base of upper mandible covered with rigid, appressed, bristly plumuli, concealing the nostrils. Wings very long, reaching beyond the middle of the tail; first, second, and third primaries nearly equal, second usually a little the longest. Feet short, weak; tarsus about equal to middle toe and claw. Inner lateral toe rather longer than the outer; hind toe rather longer than the inner lateral, its claw longer than the digital portion. Tail moderately long, deeply forked; of twelve feathers.

A genus of fringilline birds of the sub-family *Coccothraustinæ* Baird, as defined by that author, coming between *Cannabina* Brehm, (Handbuch, 1828, Type *F. cannabina* Linn.), and *Leucosticte*, Swainson, (F. B. A. 1831, iii. 265, Type *Linaria tephrocotis*, Sw.,) though its affinities are clearly with the former genus. The general form, in the long wings, moderately long, forked tail, and very short, weak feet, and to some extent the pattern of coloration, in the conspicuous pileum, gular patch, rosy rump, &c., are very similar. But im-

portant differences are to be found in the slenderer, much more acutely pointed bill, with its decidedly concave lateral outlines, and the different character of the nasal plumuli. The toes are much shorter, the lateral unequal, and the tail feathers broader and more rounded.

Aegiothus of Cabanis (Mus. Hein. 1851, 161,) is based upon the *Fringilla linaria* of Linnæus; and supersedes *Acanthis* of Bonaparte (Consp. Av. 150,) which though used in connection with the present genus, is pre-occupied for another group.

AEGIOTHUS FUSCESCENS Coues, Nov. sp.—Dusky Red Poll.

A. Aegiotho linario paululum minor, rostro fusco magno, robusto plumul s brevibus sparsisque; superioribus partibus fuscis, vix lutêo striatis; alis caudâque vix albido marginatis, lateribus distinctè nec confluentè fusco-striatis. Mas nupt. temp. uropygio rosaceo, pectore carmesino. Long. 5.25 pollices; ala 2.90 poll.

Sp. Ch. Bill large, very stout, the culmen and gonys slightly convex. Nasal plumuli very short and scant, barely covering the nostrils. Wings very long, pointed; first primary usually longest, second nearly, sometimes quite equal to it, third and fourth successively a little shorter. Tarsus about equal to middle toe and claw. Inner lateral toe but very little longer than the outer, its claw reaching scarcely beyond the basal third of the middle claw. Tail of moderate length, deeply forked. *Male, adult.*—Bill dusky except at base below. Frontlet, space between eye and bill, and gular patch, dull sooty brownish black. Entire upper parts deep dusky or chocolate brown, the edges of the feathers scarcely lighter. Rump whitish, tinged with rosy, thickly streaked with dusky. Wings, wing-coverts, and tail, deep dusky, very narrowly margined and tipped with dull whitish. Throat, breast and sides for some distance bright rosy, or carmine. Sides thickly marked with narrow, sharply defined streaks of chocolate brown. Rest of under parts white. *Female adult.*—Rather smaller than the male; rump but slightly tinged with rosy, and few or no traces of the carmine on the breast, which is dull white streaked with dusky. Other parts as in the male.

Length 5.25 inches, extent 9.00, wing 2.90, tail 2.30. Bill above .35. Tarsus .55; middle toe with claw .55; inner lateral .38.

Habitat.—Northern and Eastern North America. Fort Resolution, (Kennicott.) Labrador, (Coues.)

The essential features in which this species differs from the *A. linaria*, are those given in the diagnosis. The most striking peculiarity of *form*, as there stated, lies in the bill, which in size and proportions more resembles that of *Leucosticte* than *Aegiothus*. The nasal plumuli are much shorter and more sparse. The other proportions are as in *A. linaria*, but the size is somewhat less. The colors are very different; the upper parts of *A. fuscescens* being so dark and so obsoletely streaked as to seem almost uniform, which appearance is further heightened by the very narrow light edging to the wings and tail, which is reduced to a minimum. The sides are very thickly, but at the same time very distinctly, streaked with narrow sharply defined lines of deep chocolate brown. These streaks in *A. linaria* are less numerous, illy defined and more or less confluent. The carmine on the breast of full plumaged males appears to be deeper than is usual in *A. linaria*, while at the same time the rump is less rosy.

This interesting bird, though by no means so common as the Tit-lark or White-crowned Sparrow, is yet abundant along the coast of Labrador, where apparently it replaces the allied *Chrysomitris tristis*, its southern representative. It is a remarkably unsuspicious and familiar species, showing no signs of fear even when very closely approached. It frequents almost exclusively the scrubby juniper which grows every where in open places, in thick, almost impenetrable patches. I do not think that I ever observed it in more densely

[Aug.

wooded districts. Its flight is performed in an irregular desultory manner, rising and falling in cycloidal curves, and is seldom protracted to any great distance. While passing over head it utters continually a peculiar rattling chirp impossible to describe, yet once heard never to be mistaken; and while seated on a twig, or engaged in searching for food, it has all the plaintive and varied modulations for which the *Chrysomitris tristis* is so noted, and from which the latter derives its specific name. I never heard any thing that could with any propriety be called a song. The food of this species consists entirely of the seeds of various grasses; and when shot while feeding, it will be found to have the throat crammed with them. In this respect, as well as in voice, flight and general manners, I could not but be struck with the similarity which exists between this bird and the common Goldfinch. Audubon, in his account of the *A. linaria*, is at some pains to refute the opinion that there exists between that bird and the *Chrysomitris*, the great similarity in general habits that has been ascribed to it. Receiving the testimony of that unrivalled student of nature, the close resemblance which I am able to state does exist between the present bird and the Goldfinch, would furnish, if necessary, additional proof of the specific distinction of *A. fuscescens* and *linaria;* since the habits and manners of two birds, however closely allied, will always be found to differ in some particulars.*

PASSERCULUS SAVANNA (Wils.), Bon.—Savannah Sparrow.

Emberiza savanna, Aud. Birds Amer. iii. 68; pl. 160.
Passerculus savanna, Baird, Gen. Rep. 442.

The partiality of this species for low moist meadows and watery savannahs, and the vicinity of the sea-shore, where it frequently associates with the *Ammodromus caudacutus*, is well known as its most characteristic habit. In Labrador, where it is abundant during the summer months, I never noticed it in any other situation. It was frequently to be seen even on the beds of dried "Eel-grass," (*Zostera*,) along the rocky shore, searching for food in company with the Tit-larks, and Bonaparte's Sandpipers, *Actodromas Bonapartei*. It is a shy and timid species, when approached darting at once into the thickest and rankest grass. It is then rather difficult to procure; for it rises only when almost trodden on, flies a few yards in a rapid zigzag manner, and then darting down again, runs rapidly to a considerable distance. It is a very active species, almost continually in motion, running nimbly through the tall grasses like a mouse. I heard no notes except the usual sparrow-like chirp, though in the spring it has considerable vocal powers as I have ascertained on other occasions.† The young differ greatly from the adult, the plumage being every where strongly tinged with ferrugineous, most conspicuous on the wing coverts and tertials; the under parts are thickly streaked with dusky. On the 1st of September, when I left the country, the species was still numerous, apparently as much so as ever.

While off the coast of Nova Scotia, the land appearing as an indistinct line on the horizon, a Savannah Sparrow alighted on the vessel in so exhausted a state, as to suffer itself to be taken in hand. After resting a short time, however, it took flight and disappeared in the direction of the land, which it no doubt reached in safety.

ZONOTRICHIA LEUCOPHRYS (Forst.) Sw.—White-crowned Sparrow. "Chip-bird."

Fringilla leucophrys, Aud. Birds Amer. iii. 157; pl. 192.
Zonotrichia leucophrys, Baird, Gen. Rep. 458.

This large and handsome Finch breeds in great numbers along the entire

* No individuals of *A. linaria* were seen during my stay in Labrador.
† At Washington, D. C., in the month of April.

coast of Labrador. Though I found it plentiful in every locality which I visited, and in all situations, it seems particularly fond of deep thickly wooded and secluded ravines, surrounded by high precipitous cliffs; and when in more open districts confines itself chiefly to the most tangled patches of juniper and scrubby fir. It is a very active and sprightly bird, almost continually in motion; it seldom alights without jerking and flirting the tail, and rapidly uttering its loud chirping. While the female is incubating, the male has a habit of mounting to the top of the cliff or tree nearest his nest, and there repeating his loud, somewhat monotonous, but not unpleasing notes for a half hour at a time. This song is very similar to that of the allied *Z. albicollis*, the common White-throated Sparrow, and consists of two long drawn syllables with a rising intonation, and then three more in a quick hurried manner, with a falling cadence; "*pēē, dēē, dĕ-dĕ-dĕ*;" the whole a mellow whistle. Should the performer be observed or approached while thus engaged, he instantly becomes silent, and dives hastily into the nearest cover.

The nest of the White-crowned Sparrow is always, I believe, placed on the ground; and, oftener than elsewhere in the midst of the little patches of a low heath that grows abundantly wherever the ground is dry enough. It is composed externally of moss, internally of fine dried grasses, evenly disposed in a circular manner. The eggs are four or five, oftener the former. Nuttall,* when he states that "the eggs, four or five in number, are said to be of a dusky or chocolate color," probably had reference to those of *Anothus ludovicianus*, which are much as he describes them. A nest of the White-crowned Sparrow, which I found on the 23d of July, contained four young, but a few days old. These, however, must have been rather late, as by the 1st of August there were many young birds to be seen. The female, when surprised on the nest, flutters off in silence, retiring but a short distance; but the male, if he be near, instantly flies to the top of the nearest tree or bush, and there vociferates his angry remonstrances, flirting his tail and jerking his body in the most energetic manner. This species, though not so familiar as the Tit-lark, is still frequently seen about the houses; and it is known to the natives simply as the "Sparrow," or oftener as the "Chip-bird."

JUNCO HYEMALIS (L.) Sclater.—Snow-Bird.

Niphœa hyemalis, Aud. Birds Amer. iii. 88; pl. 167.
Junco hyemalis, Baird, Gen. Rep. 468.

The Snow-bird, so common and so well known in winter throughout the eastern portions of the United States, is not so abundant as might be expected in Labrador, one of its breeding regions. From the fact that I was not in a suitable locality, I did not observe it until the latter part of July, at which time it was in small companies, the old and young associating together. They kept entirely in the thick woods, and were rather timid. I heard no song, nor indeed any note except the easily recognized chirp peculiar to this species.

Until within a few years the breeding places of the snow-bird were unknown, and its nidification involved in an obscurity remarkable for so common and familiar a bird. But it is now well ascertained to breed in the entire region around Hudson's Bay, and southward in the mountainous regions of New York and Pennsylvania.

SPIZELLA MONTICOLA (Gm.) Baird.—Tree Sparrow.

Emberiza canadensis, Aud. Birds Amer. iii. 83; pl. 166.
Spizella monticola, Baird, Gen. Rep. 472.

This little Sparrow is quite common in all wooded districts in Labrador. It is there a very tame and unsuspicious bird, showing no fear even when very

* Manual of Ornithology, 1st ed. i., page 479.

closely approached. I heard no note beyond the usual sparrow-like chirp. It probably leaves the country for the south by the 1st of October, as early in November it is abundant throughout the United States as far south, at least, as Washington, where it may be found in great numbers during the winter months.

SCOLECOPHAGUS FERRUGINEUS (Gm.) Sw.—Rusty Grakle.

Quiscalus ferrugineus, Aud. Birds Amer. iv. 65; pl. 222.
Scolecophagus ferrugineus, Baird, Gen. Rep. 551.

This, the only representative of the *Icteridæ* I observed in Labrador, appears to be rather uncommon. I noticed nothing peculiar in its habits, very probably, however, because my opportunities for observation were so limited. The only note I heard was the rough guttural "*chuck*," common to most of the species of the family. On the 24th of July, I came upon a family of these birds, in a densely wooded marshy spot. The young were at that time just fully fledged, and were fluttering around the vicinity of the nest. The species is confined to heavily wooded districts, showing evident partially for the low swampy or boggy localities, interspersed with pools, for which some parts of Labrador are so famous.

CORVUS CARNIVORUS Bartram.—Raven.

Corvus corax, Aud. Birds Amer. iv. 78; pl. 224.
Corvus carnivorus, Baird, Gen. Rep. 560.

This celebrated bird does not appear to be rare along the coast of Labrador. The high, precipitous and almost inaccessible cliffs, which, rising abruptly from the sea, give to this rock-bound coast such a barren aspect, afford safe and convenient retreats, where it constructs its nest, and rears its young in perfect safety. It is so excessively watchful and wary a bird, that although we saw them frequently, not a single individual was shot by any of our party. Indeed, I know of no bird more difficult to procure than the Raven; for in addition to its natural sagacity, which surpasses that of almost any bird, the peculiar nature of the rocks it inhabits render the surprising of it almost an impossibility. Its voice is similar to that of the common crow, but far louder and rougher. Ravens are most frequently seen in pairs; and they often descend to the sea shore, to feed on the dead fish, crabs, and other animal substances thrown up by the waves. The eggs, when they can be procured, are *eaten* by the natives; a species of vandalism well calculated to disturb the equanimity of any ardent collector or naturalist.

At Henley Harbor, an arm of Chateaux Bay, at the northern entrance to the straits of Belle-Isle, there is a remarkable geological formation, known as the "castle." This singular *butte* rises abruptly to a height of between 150 and 200 feet above the level of the sea. The sides are either perpendicular or even over-hanging, the strata perfectly vertical, regular and composed of pentagonal prisms, remarkably distinct. The top is perfectly smooth and level, and covered with a rich growth of moss, lichens, and the *Empetrum nigrum*. The ascent can be effected only at one point, where the soft crumbling rock has been worn away by the long continued trickling of water. The whole appears to be in a state of rapid decomposition; large masses of rock lie around the base in confusion, the strata, however, still distinctly visible. The débris thus accumulating at the base has raised a slope to within about fifty feet of the summit. A narrow but very deep channel, cut apparently by the action of the water, separates from it an island on which is another but less extensive formation of the same nature. This "castle" was the abode of a pair of Ravens, which, I was told, had resorted there regularly for several years. The nest was placed on a narrow ledge, inaccessible except from above by means of a rope. It was empty at the time I visited the place.

CORVUS AMERICANUS Aud.—Crow.

Corvus Americanus, Aud. Birds Amer. iv. 87; pl. 225. Baird, Gen. Rep. 566.

On the 14th of July, while under full sail, a crow flew directly past the vessel, near enough for me to identify it without the possibility of mistake. It was the only individual observed during my whole stay in the country.

PERISOREUS CANADENSIS (L.) Bon.—Canada Jay. "Whiskey Jack."

Garrulus brachyrhynchus, Swainson, F. B. A. 1831, ii. 296; pl. 53. juv.
Garrulus Canadensis, Aud. Birds Amer. iv. 121; pl. 234.
Perisoreus Canadensis, Baird, Gen. Rep. 590.

My first acquaintance with this remarkable Jay was on the 1st of August, in a very dense spruce forest. Contrary to my previous impressions regarding the species, on this occasion they were very shy, alighting only on the tops of the tallest trees, and flying off with loud harsh screams on my approach. Subsequently, however, at Rigolet, I found them abundant, and very familiar; one or more were always to be seen hopping unconcernedly in the garden patches around the houses, not in the least incommoded by the presence of man, and showing no signs of fear when very closely approached. The voice of this bird is a loud, harsh, discordant scream, very unlike that of the Blue Jay, *Cyanura cristata*. It possesses all the cunning and thievish propensities for which the whole family of garruline birds are so noted. It is particularly expert in stealing the bait from the fox and marten traps, on which account it is greatly detested by the hunters, who destroy it whenever opportunity occurs. Its most common appellation is simply "*Jay-bird*," though it is also known as the "*Whiskey-Jack*." According to Dr. Suckley, (P. R. R. Rep. xii. pt. ii., p. 216,) who is indebted to Mr. Kennicott for the information, this curious appellation is probably a corruption of the Chippeway name "*Wiss-ka-chon*," changed first into "*Whiskey-John*," and then further twisted to "*Whiskey-Jack*."

The young Canada Jay is wholly of a dull sooty black, with no white whatever about the head. In this state of plumage it has been described and figured by Swainson (F. B. A. 1831, ii. page 296, pl. 55) as a distinct species, under the name of *Garrulus brachyrhynchus*.

TETRAO CANADENSIS Linn.—Canada Grouse. "Spruce Partridge."

Tetrao Canadensis, Aud., Birds Amer. v. 83, pl. 294. Baird, Gen. Rep. 622.

Although the proper abode of the Canada Grouse is the dense and almost impenetrable forests of spruce and fir in the regions around Hudson's Bay, where it is an abundant bird, it is also found as far south as Maine and New York. There, however, it is chiefly confined to the more mountainous regions. In the west it is replaced by the closely allied *T. Franklinii* of Douglas, distinguished by the absence of the rufous band on the tail, and the conspicuously white margins of the tail coverts. The Canada grouse are mostly restricted to thickly wooded regions, where they find an abundance of their favorite food, consisting of seeds and berries of all kinds, and the buds of various shrubs. When skinned they emit a peculiar aromatic odor, arising from the highly flavored nature of their food; their flesh is dark colored and rather bitter. When disturbed they fly but a short distance, soon alighting on the trees, in which position they may be easily approached. The young, which seldom, I believe, number more than five or six, are led about by the parent for some time after they are able to fly. On the 24th of July I surprised several broods, still under the care of the parent. The mother, on discovering me, instantly uttered a "cluck," very similar to that of the common hen, and flew on to the nearest tree, while the young scattered in every direction, and concealed themselves in the thickest brush. A chick which I obtained at that date flew with perfect ease, though it could not have been more than

[Aug.

two weeks old, and was as yet covered with scarcely anything but down. Its color was a dirty yellow; the few feathers buff, transversely barred with brown; and in size it was about equal to a chicken a week or ten days old.

The species is invariably known as the "Spruce Partridge."

LAGOPUS ALBUS (Gm.) Aud.—Ptarmigan. "Willow Partridge."

Lagopus albus, Aud., Birds Amer. v. 114, pl. 299. Baird, Gen. Rep. 633.

Great confusion prevails among the North American Ptarmigan, both with reference to the number of species to be enumerated, and their relationships to those of Europe. This is occasioned partly by the remote and inaccessible nature of the regions they inhabit, which cause comparatively few specimens to reach the hands of naturalists, and the difficulty of procuring them in summer plumage; since in winter they are almost entirely white, and present few distinctive marks beyond those of size and slight differences of proportions. By the latest authority on the subject, four species are assigned to North America: *L. albus* Aud., (the old *Tetrao albus* of Gmelin,) the largest, entirely white except the tail feathers, and with a very stout bill; *L. rupestris* Leach, which is smaller, with a slenderer bill and a black stripe through the eye; *L. Americanus* Aud., a species doubtfully admitted, coming nearest to the *albus;* and *L. leucurus*, a small western species, concerning which there has been no difficulty. Two of these species are found in Labrador: the *L. albus* and *rupestris*, known respectively as the "Willow" and "Rock Partridge." The distinction between them is always recognized; and they are so named from the fact that the former is confined chiefly to thickly wooded districts, while the latter inhabits more open and barren situations.

On the 23d of July I came upon a pair of the larger kind, amid tangled bushes in a low swampy situation. They were very tame and unsuspecting, walking unconcernedly along but a few feet from me, though their being in deep moult, and unable to fly, may have been the cause of this remarkable familiarity. I am credibly informed, however, that at certain seasons, while perched on trees, they can be captured by a noose at the end of a rod or pole. Great numbers of these birds are skinned and stuffed by the natives, while in winter plumage, and sold for about 25 cents apiece. While being skinned, they emit a highly aromatic odor, very similar to that given out by the Spruce Partridge. Their flesh is much used as an article of food.

LAGOPUS RUPESTRIS Leach.—Rock Ptarmigan. "Rock Partridge."

Lagopus rupestris, Aud., Birds Amer. v. 122, pl. 301. Baird, Gen. Rep. 635.

This species also occurs along the coast of Labrador, though, as might be expected from the densely wooded nature of the greater part of the country, much less abundantly than the preceding. I did not meet with it except in the collections of the natives.

BOTAURUS LENTIGINOSUS Steph.—Bittern.

Ardea lentiginosus, Aud., Birds Amer. vi. 94, pl. 365.
Botaurus lentiginosus, Baird, Gen. Rep. 674.

The Bittern is the only species of Heron which ventures so far north as Labrador, with the exception of the *Ardea herodias* and *Nyctiardea Gardeni*, which may possibly be found within its limits. The only indications I discovered of the presence of the Bittern was a wing in the possession of a hunter, who, however, did not consider it as a very rare bird.

CHARADRIUS VIRGINICUS Borck.—Golden Plover.

Charadrius marmoratus, Aud., Birds Amer. v. 203, pl. 316.
Charadrius Virginicus, Cassin, Gen. Rep. 690.

No Golden Plovers were observed until a short time before we left the country; then, about the date of the departure of the Curlews, *Numenius borealis*, they made their appearance in small numbers, in flocks of about a dozen or more. Some of them were in very perfect plumage.

ÆGIALITIS SEMIPALMATUS (Bon.) Cab.—Ring Plover. "Ring-neck."

Charadrius semipalmatus, Aud., Birds Amer. v. 218, pl. 320.

Aegialitis semipalmatus, Cassin, Gen. Rep. 694.

The Ring Plovers are excessively abundant during the summer months along the whole coast of Labrador, which is one of their favorite breeding localities. On the first of September they had not yet left the country, being still as abundant as ever. When not separated into pairs for the purposes of reproduction, they frequent mostly sandy beaches and muddy flats, where they are found in loose straggling companies of from five or six to a dozen or more individuals, associated with the Semipalmated and Bonaparte's Sandpipers. They scatter widely apart while searching for food, running swiftly and gracefully over the sand, with the head lowered. They are at such times usually silent, except when disturbed, when they utter a loud mellow whistle on taking flight. Of all the smaller waders, none, with the exception of Bonaparte's Sandpiper, *Actodromas Bonapartei*, is so gentle and unsuspicious. They never seem to notice an approach of a few yards, and indeed I have sometimes found it difficult to force them to fly. They merely run swiftly a few steps, and then stand perfectly motionless, regarding the intruder in silence. The young run about as soon as hatched, and follow the parent, who leads them in search of food. They are at this time prettily mottled with black, light brownish and white, most of the under parts remaining of the latter color. Birds of the year may at all times be distinguished from the adults by the black of the bands being replaced by dull dirty ash.

No individuals of the *A. melodus* were observed in Labrador, nor did I find any indications of their presence there. From the fact of Audubon's finding them at the Magdalene Islands, it is to be supposed that they breed, sparingly at least, in the country.

STREPSILAS INTERPRES (L.) Ill.—Turnstone. "Chickling."

Strepsilas interpres, Aud., Birds Amer. v, 231, pl. 323. Cassin, Gen. Rep. 701.

The Turnstone I first observed at Henley Harbor, on the 20th of August, when the smaller waders generally had commenced their southern migration. How long they remain in the country I do not know, but on the 1st of September they were apparently as numerous as ever. Though not a very abundant species, I was enabled to procure a sufficient number of specimens, and to observe its curious habits. It afforded me much pleasure to notice with what dexterity they insert the bill beneath small stones and pebbles, and with a quick jerk turning them over, seize upon their prey lurking beneath. Though more shy and wary than the Sandpipers usually are, they did not seem to be as much so as the larger Tatlers. They are known to gunners by the name of "Chicklings."

PHALAROPUS FULICARIUS (L.) Bon.—Red Phalarope. "Bay-bird."

Phalaropus fulicarius, Aud., Birds Amer. v. 291, pl. 339. Cassin, Gen. Rep. 707.

Three specimens of this species were shot at sea, off Belle-Isle, from a flock of six. They were flying in a very compact body, much in the manner of the smaller Sandpipers, for which I at first mistook them. The sailors called them "Bay birds." While at sea we frequently saw this species, or the *P. hyperboreus*, resting gracefully on the water, particularly near masses of floating seaweed. Indeed, the Phalaropes, as a genus, are noted among all the smaller

waders, both for their beauty and elegance of form, and their grace and activity of movement; whether running swiftly along the sandy shore, or swimming buoyantly on the water, or stepping lightly over the floating leaves of aquatic plants, their motions are equally pleasing. Their lobed feet make them perfectly at home on the water, and they are often seen at a considerable distance from land. The *fulicarius* and *hyperboreus* are both known by the uncouth and inappropriate, though curious name of "*Sea-geese.*"

GALLINAGO WILSONI (Temm.) Bon.—Wilson's Snipe.

Scolopax Wilsoni, Aud., Birds Amer. v. 339, pl. 350.
Gallinago Wilsoni, Cassin, Gen. Rep. 710.

From the accounts of the natives, I should judge that the Snipe is abundant in Labrador, as it is in most parts of the United States. I met with but a single individual.

MACRORHAMPHUS GRISEUS (Gm.) Leach.—Red-breasted Snipe.

Scolopax noveboracensis, Aud. Birds Amer. vi. 10, pl. 351.
Macrorhamphus griseus, Cassin, Gen. Rep. 712.

I procured a single individual of this species in immature plumage on the 23d of August, but I learned nothing further respecting it than that it is known by the name of "Brown-back."

TRINGA CANUTUS Linn.—Red-breasted Sandpiper.

Tringa islandica, Aud. Birds Amer. v. 254, pl. 328.
Tringa (*Tringa*) *canutus*, Cassin, Gen. Rep. 715.

This large Sandpiper I met with for the first time at Henley Harbor, on the 21st of August, when the *Tringas* and small Waders generally had commenced their southern migration. A few specimens were procured, in immature plumage, showing but slight traces of reddish on the under parts.

ACTODROMAS Kaup.

Actodromas, Kaup., Sk. Ent. Eur. Thierw. 1829. Typus *Tringa minuta* Leisl.

Gen. char. Bill about as long as, or very little longer than, the head, straight, slender, compressed, the tip very slightly expanded. Both mandibles deeply grooved to the expansion of the tip. Wings long; the first and second primaries about equal, the rest rapidly graduated; secondaries short, obliquely incised at the ends; tertials long, slender, flowing. Tail rather long, doubly emarginate, the central feathers projecting. Tibia bare for two-thirds the length of the tarsus. Tarsus about equal to the bill, and equal to the middle toe. Toes entirely free at base, and but very slightly margined. Hind toe very short.

The characters of this genus are well marked and decided, and are very different from those of *Tringa*, with which it is usually associated. In the latter, the bill is very stout, much expanded at tip, and considerably longer than the head or tarsus; the tertials short, thick and comparatively stiff; the tarsus is much longer than the toes, which are very short, stout and widely margined; the tibial feathers reach nearly to the joint, and the tail is nearly even, with the central feathers not projecting. The pattern of coloration is very different. In all these particulars of form and proportion, *Tringa* has very little similarity to *Actodromas*, which is well worthy of full generic rank. As already indicated, the essential characters of the latter lie in the proportions of the bill, tarsus and toe, which are of equal length, and in the doubly emarginate tail. Other features are found in the elongated tertials, long, much exposed tibiæ, almost entire want of margins of the toes, &c. The known species are very similar in general pattern of coloration, all having the upper parts varied

with deep brownish, light ashy and reddish; the breast and jugulum with an ashy or brownish suffusion, the rest of the under parts being white. All, except *A. Bonapartei*, and *A. Cooperi*, have a central blackish field on the rump. The genus comes nearest to *Pelidna* Cuvier, (Regn. Anim. 1817; type *T. cinclus*, L.) which, however, differs in the long decurved bill and some other peculiarities.

ACTODROMAS MACULATA (Vieill.) Cassin.—Pectoral Sandpiper. "Grass-snipe."

Tringa pectoralis, Aud., Birds Amer. v. 259, pl. 329.
Tringa (Actodromas) maculata, Cassin, Gen. Rep. 720.

The "Grass-snipe," as this species is most appropriately called, differs essentially in its habits from any other Sandpiper with which I am acquainted, except the *A. minutilla*. Between these two species, however, there is a striking similarity, both as regards form, color and general habits. I first noticed the Pectoral Sandpiper at Henley Harbor, on the 20th of August, when it had commenced its southern migration. I there found it abundant, and had ample opportunities both of observing its habits and procuring specimens.

This species is seldom or never seen on open sandy beaches, as it prefers at all times the low muddy flats laid bare by the tide, the pools and ditches which intersect them, and the salt marshes by which they are bordered. They are not restricted to the neighborhood of the sea, but frequent low wet meadows and fields at a great distance from any large body of water. There they walk slowly and sedately through the grass in search of food, having little or none of the restless activity which characterizes most Sandpipers. While thus engaged the tail is generally elevated, somewhat on the manner of the *Zenaidura Carolinensis*, if comparison can be made between two birds so dissimilar. This habit of frequenting meadows has gained for them their common appellation of "Grass-snipe." When they rise from the grass to alight again at a short distance, they do so in silence, or with a single "tweet," and fly slowly evenly, and with the wings deeply incurved. When, however, they are frightened, by being repeatedly forced up, or when they are suddenly startled, they spring vigorously, emitting loud rapidly repeated notes, and fly in a quick zigzag manner, like the common snipe. They are then equally difficult to shoot. On several occasions I have noticed a habit which this bird possesses, which I do not recollect of ever having seen stated. When suddenly startled they rise with a loud note, and mounting very high in the air circle over the head of the intruder for several minutes, flying with very great rapidity and in perfect silence. When about to alight, which they often do at the very spot from which they rose, they nearly close the wings, and dart suddenly down in an almost perpendicular direction. This curious habit I have also observed at Portsmouth, N. H., and frequently at Washington, D. C.

This species is found in pairs or singly, and never, I believe, in flocks of any extent. They are very tame and unsuspicious, permitting a near approach without becoming alarmed. In the fall they are excessively fat and delicately flavored, and afford delicious eating. Very little is known of their breeding places, or of their peculiar habits during the season of reproduction.

ACTODROMAS MINUTILLA (Vieill.) Coues.—Least Sandpiper. "Peep."

Tringa minutilla, Vieillot, Nouv. Dict. 1819, xxxiv. 466. Gray, Genera, 1849, iii. 579.

Actodromas minutilla, Coues, Monog. *Tring.* N. A., in Pr. A. N. S. Ph. July, 1861, 191.

Tringa pusilla, Wilson, Am. Orn. 1813, v. 32, pl. xxxvii. fig. 4; id. Brew. Ed. 1840, 347, fig. 161; id. Ord. Ed. 1829, iii. 134; nec Linnæi. Swainson, F. B. A. 1831, ii. 386. Audubon, Orn. Biog. 1834, iv. 180; id. Birds Amer. 1842, v. 280, pl. 337; id. Syn. 1839, 237. Giraud, Birds L. I. 1844, 240. Gray, Genera, 1849, iii. 579.

[Aug.

Pelidna pusilla, Bonaparte, Comp. List, 1838, 50. Gosse, Birds Jamaica, 1847, 348.
Tringa (*Tringa*) *pusilla*, Bonaparte, Comp. Specch. 1827, 62.
Tringa Wilsoni, Nuttall, Manual, 1834, ii. 121. Cooper and Suckley, Nat. Hist. Wash. Terr. 1860, 240. Cassin, Pr. A. N. S. 1860, xiii. 196.
Tringa (*Actodromas*) *Wilsoni*, Cassin, Gen. Rep. 1858, 721.

Until very recently, great confusion has prevailed among the smaller Sandpipers; and even now, though the species are pretty well ascertained, the proper name applied to each, and their synonomy, are points which are not yet definitely settled. With regard to no name, however, has there been so much difficulty as to that of *Tringa pusilla* Linn., the proper locating of which has ever been a disputed point. Most authors have referred it to the bird which Wilson, in 1813, (Am. Orn. ut suprà,) designated by that name, and which was subsequently, in 1834, dedicated to that naturalist by Nuttall, (Man. Orn. ut suprà.) Audubon, in all his works, Gray, in his genera, and Bonaparte, in his earlier works, adopted the name of *pusilla* for the present bird. As early as 1825, however, Bonaparte was aware that the *T. pusilla* of Linnæus was not the bird that Wilson gave under that name; for, in his observations on Wilson's Nomenclature, pages 88, 89, on the subject of *Tringa semipalmata*, Wils., he says, "Several species have been confounded together under the name of *T. pusilla; and although the present*" (*T. semipalmata*, Wils.) "*is the real species*," &c. In 1858, Cassin (Gen. Rep. page 725) proved pretty conclusively that the *T. pusilla* of Linnæus, based upon the *T. cinclus dominicensis minor* of Brisson, is really the *Ereunetes petrificatus* of Illiger, though he does not change Illiger's specific name. This, however, he has recently done in the Proceedings of the Philadelphia Academy, (xii. 195, 1860,) where he gives the bird as *E. pusillus*.

The name of *pusilla*, then, being exploded for the species now under consideration, the question arises what specific name is to be applied to it. Later authors have mostly taken that of *Wilsoni*, given to the species in 1834, by Nuttall, who describes its habits so accurately that there can be no doubt as to what bird he has reference. But the claims of "Le tringa maringouin," *Tringa minutilla* of Vieillot (Nouv. Dict ut suprà) to be the present species, appear to have been overlooked, or at least not generally conceded. Brewer, indeed, in his edition of Wilson, in 1840, quotes it, and Cassin, in the General Report in 1858, gives it as a synonym, but both with a query. But that *Tringa minutilla* really refers to the present species, there can be, I think, no reasonable doubt. Vieillot, page 466 of the Nouv. Dict., says of it, "Le nom que j'ai conservé à cet oiseau est celui sous lequel il est connu dans nos colonies de l'Amerique, et qui lui a été imposé d'après sa petite taille;" and after a description which applies well, he continues—"Il a des rapports avec le *tringa minuta* de Leisler," and adds, speaking of its habits, "Comme les *tringas becos* se comportent de même, il est résulté qu'on les a confondus ensemble." The description, especially with reference to size ("quatre pouces dix lignes") and to the length and proportions of the bill, ("noir, très grêle, et long de neuf lignes; les tarses de la même longuer,") will apply to no other species. Another evidence that this description has reference to the *Actodromas Wilsoni*, is the fact that the author recognizes *Tringa semipalmata*, Wils. "Le tringa demipalmé" as a totally distinct species. What the "tringa beco, *Tringa pusilla*, Lath.," of page 452 of the same work, refers to, is rather difficult to determine. Vieillot refers to the Am. Orn. plate 37, fig 4, which is *Tringa pusilla* of Wilson; but also quotes Brisson's "petite Alouette-de-mer de Saint-Dominque" which is *Ereunetes petrificatus* of the General Report. The description, however, applies best to the latter, which it may be well to consider it.

From the foregoing considerations, therefore, I cannot but adopt the specific name of *minutilla*, which has priority over *Wilsoni*, at least until weightier

reasons are adduced on the opposite side of the question. With regard to the generic characters there is not the slightest difficulty. The bird presents the closest affinity to the type of the genus *Actodromas*, (*T. minuta* Leisl.,) and is very different from either *Tringa* or *Pelidna*, in both of which it has been placed.

This diminutive species, in form, color and general habits, is very closely allied to the preceding, of which it is in fact a perfect miniature. As far as my own observation extends, the same remarks with regard to the manners, voice, flight, &c., apply equally well to this species. It even possesses the curious habit mentioned under the preceding bird. Though so much smaller, its note is fully as loud and piercing. The chief difference is, that in the fall the Least Sandpipers collect in flocks of considerable extent, and that they are found on sandy beaches oftener than are the Pectoral Sandpipers. Nevertheless, its favorite situations are low muddy flats, and the ditches that intersect marshy and sedgy fields, where it finds an abundance of its favorite food. In Labrador I think I never observed them in any other situations. They search for food with remarkable industry and perseverance, carefully examining with their delicate bills every inch of ground they pass over; while thus engaged they may be approached within a few feet without showing any signs of fear. Together with the *A. Bonapartei* and the *Ereunetes pusillus*, they are known by the common name of "Peeps." On the first of September they had not left the country, being still abundant.

ACTODROMAS (HETEROPYGIA) BONAPARTEI (Schl.) Cassin.—Bonaparte's Sandpiper. "Peep."

Pelidna cinclus, var. Say, Long's Exped. 1823, i. 172.
Tringa Schinzii, "Brehm." Bon. Syn. 1828. [Nec Brehm.] fide Gen. Rep. Aud. Birds Amer. 1842, v. 275, pl. 335, et al. Auct. Amer.
Tringa Bonapartei, Schlegel, Rev. Crit. Ois. Eur. 1844, 89.
Tringa (*Actodromas*) *Bonapartei*, Cassin, Gen. Rep. 722.
Actodromas (*Heteropygia*) *Bonapartei*, Coues, Monogr. Tring. N. A., in Pr. A. N. S. Ph. July, 1861, 199.

Audubon, in his account of this species, remarks: "Those procured in Labrador were shot in the beginning of August, and were all young birds, apparently about to take their departure." I met it for the first time on the 30th of July; but on the first of September, when I left the country, they were still as numerous as ever. They are found in great abundance on the rocky shores of Labrador, where covered with sea-weed and interspersed with muddy flats and shallow pools, in which last the birds wade quite up to the breast. I have also frequently seen them in a situation where I never found any other Sandpiper—on the large masses of rock sloping down abruptly to the water, green and slippery from the continued falling of the spray. They seem to be very fond of these locations, and I seldom passed one without seeing several of these "peeps" running nimbly about; and I have actually approached within three or four feet of them, as they stood motionless regarding me with curious eye. Of all the Sandpipers this is the most gentle and unsuspecting; they seem utterly regardless of the presence of man, and do not intermit their occupation of searching for food, though the observer may be standing within a few feet of them. When startled they emit a low soft "*weet*" very different from that of any other Sandpiper, and fly off in a very compact flock. If a part of them be killed, the gunner may commit equal havoc with his second barrel, as after a few circlings they fly past, or alight again on the same spot. They fly rapidly, in a rather unsteady manner, alternately showing the under and upper parts; and they may always be recognized in flight by the conspicuously white upper tail coverts. They usually associate with the

[Aug.

Semipalmated Sandpipers and the Ring Plovers, and in common with other small species are known by the general name of "Peeps." Those that I shot were not so excessively fat as the *A. maculata* and *Ereunetes pusillus* commonly are at the same season.

EREUNETES PUSILLUS (Briss.) Cassin.—Semipalmated Sandpiper. "Peep."

Tringa cinclus dominicensis minor, Brisson, Ornith. 1760, v. 222, pl. xxv. fig. 2, [haud dubiè.]

Tringa pusilla, Linnæus, Syst. Nat. 1766, i. 252, fide Gen. Rep.

? Tringa pusilla, Vieillot, Nouv. Dict. 1819, xxxiv. 452, [ad *T. cincl. dom. min.* Briss. refert.]

Ereunetes petrificatus, Illiger, Prod. 1811, 262. Cassin, Gen. Rep. 1858, 724.

Tringa semipalmata, Wilson, Am. Orn. 1813, vii. 131, pl. lxiii. fig. 4; id. Ord. Ed. 1829, iii. 132, pl. lxiii. fig. 4; id. Brewer, Ed. 1840, 542, fig. 225; ibid. Syn. 725. Vieillot, Nouv. Dict. 1819, xxxiv. 462; Dict. Class d'Hist. Nat. 1822, ii. 251. Swainson, F. B. A. 1831, ii. 381. Audubon, Orn. Biog. 1839, v. p. 110, pl. 408; id. Syn. 1839, 236; id. Birds Amer. 1842, v. 277, pl. 336. Giraud, Birds L. I. 1844, 239. Newberry, P. R. R. Surv. 1857, vi. 100.

Ereunetes semipalmatas, Cabanis, Schomburgk's Reise, iii. 758, fide Gen. Rep. Bonaparte, Compt. Rend. 1856, fide Gen. Rep. Cabanis, Journ. 1856, 419, fide Gen. Rep.

Tringa (Hemipalama) semipalmata, Bonaparte, Obs. Wils. 1825, num. 212; id. Specch. Comp. 1827, 62.

Tringa (Heteropoda) semipalmata, Nuttall, Man. Orn. 1834, ii. 136.

Hemipalama semipalmata, Lambeye, Av. Cubae, 1850, 96.

Hemipalama minor, Lambeye, Av. Cubae, 1850, 97.

Heteropoda semipalmata, Bonaparte, Comp. List, 1838, 49. Dekay, N. Y. Fauna, 1844, 236, pl. 86, fig. 195. Gray, Genera, 1849, iii. 580.

? Heteropoda mauri, Bonaparte, Comp. List, 1838, 49.

Ereunetes mauri, Cabanis, Journ. 1856, 419, fide Gen. Rep.

Tringa brevirostris, Spix, Aves Bras. 1825, ii. 76, fide Gen. Rep.

? Pelidna Brissoni, Lesson, Man. d'Ornith. 1828, ii. 277, [T. pusillum, Linn. citat.]

Ereunetes pusillus, Cassin, Proc. Acad. Nat. Sc. 1860, xiii. 195. Coues, Monog. Tring. N. A., in Pr. A. N. S. Ph. July, 1861, 177.

The statements made under the head of *Actodromas minutilla*, tending to demonstrate that *Tringa pusilla* of Linnæus is not the bird given under that name by Wilson, also prove that the name really belongs to the species now under consideration. As there stated, *pusilla* was applied by Linnæus in 1766 to the bird figured and described by Brisson, (Ornith. 1760, v. p. 222, pl. xxv. fig. 2,) under the appellation of "La petite Alouette-de-mer de S. Dominque," *Tringa cinclus Dominicensis minor*. The description applies well, and the figure plainly shows the webbing of the toes, a feature which exclusively characterizes this species among the smaller Sandpipers. There being no reasonable doubt, therefore, of what *pusilla* really refers to, it must, according to the laws of nomênclature, take precedence over both *petrificatus* of Illiger, and *semipalmatus* of Wilson. Cassin restores the name in the Proceedings of the Academy of Natural Sciences, above cited, there calling the bird *Ereunetes pusillus*, though in the General Report he retains the specific name of *petrificatus* bestowed by Illiger in 1811.

The webbed feet of this bird were very early made the grounds for generic distinction from *Tringa*, to which they would fully entitle it, even were no other characters involved. But though several genera have been proposed for it, fortunately there is not the slightest difficulty as to the proper one to be employed. *Heteropoda* of Nuttall, (1834,) and *Hemipalama* of Bonaparte, (1825,) must both yield to *Ereunetes petrificatus*, which, according to the Gene-

ral Report, has been proved to be the *T. semipalmata* of Wilson, by actual examination of the type specimen. This being the case, *Ereunetes* must be used in the present connection, though for the reasons given above, *petrificatus* cannot be retained. The cause of Nuttall's proposing for the bird a new genus was probably the fact that Bonaparte in 1828 employed his *Hemipalama* in connection with a very different bird—the *Micropalama himantopus* of Baird—with which it has scarcely a generic character in common except the webbed toes. As a reference to the article will show, the name was proposed for, and first used in connection with, the *T. semipalmata* Wils.

I have thought it well to present the synonomy of this species, since, as will be seen, it has received a great variety of names. According to the General Report, the *Heteropoda Mauri* of Bonaparte, or the *Ereunetes Mauri* of Cabanis, is merely a large race of the present bird; while the remarkable variations in the length of the bill, to which the species is subject, have given rise to the *Hemipalama minor* of Gundlach, and the *Tringa brevirostris* of Spix. *Pelidna Brissoni* of Lesson is probably this species, since he refers to *Tringa pusilla* of Linnæus.

No individuals of this species were observed until the latter part of July, but soon after that date they became excessively abundant, and continued so during the month of August. When on muddy flats I generally found them associated with the Ring Plovers and Bonaparte's Sandpipers; but when on open sandy beaches they keep mostly to themselves, sometimes in flocks of great extent, the other species with which they principally mix not generally frequenting such situations. When in large flocks dozens may be killed at a shot; and as, after many wheelings, they often alight again on the same spot, they afford a second opportunity to the gunner. When wounded, they swim with considerable ease, aided by their semipalmated feet; but they are not capable of diving to any extent. These birds, possessing very few distinctive traits of habit among the smaller Sandpipers, are yet remarkable in one particular—the great facility with which they may be decoyed by imitating their call—a low mellow whistle. When skilfully executed, I have seen them approach within a few feet of the person seated on a rock in full view, though a moment after, on discovering their mistake, they would immediately take flight. They are also noted for the excessively fat condition in which they are always found in the fall, exceeding that of almost any other bird of their family. In this state they are delicious eating, being tender, juicy and delicately flavored, but on account of their diminutive size they are not much sought after. This species is the "Peep" *par excellence*, though the *Actodromas Bonapartei* and *minutilla* are also known by the same name.

GAMBETTA MELANOLEUCA (Gm.) Bon.—Tell-tale. "Yellow-legs."

Totanus vociferus, Aud., Birds Amer. v. 316, pl. 345.
Gambetta melanoleuca, Cassin, Gen. Rep. 731.

This large tatler, so well known and so universally disliked by all gunners on account of its watchful and noisy nature, is a very common bird along the coast of Labrador during the summer and early fall. During the fore part of the summer I found them very wary and difficult of approach. They would stand motionless and in silence, regarding me with watchful attention until I was nearly within shooting distance, when, at a single note from one of the flock, all would instantly take flight, emitting their loud and clear whistling, as if rejoicing at my discomfiture. By the middle of August, however, they seemed to have laid aside their watchfulness, and numbers were procured without difficulty. Though found in all situations near the water, their favorite localities seemed to be the muddy flats laid bare by the tide, the salt marshes adjoining them, and the pools which dot these marshes. They are seldom found in good condition for the table, being generally very lean. They are known altogether as "Yellow-legs."

[Aug.

TRINGOIDES MACULARIUS (L.) Gray.—Spotted Sandpiper. "Teeter-tail."

Totanus macularius, Aud., Birds Amer. v. 303, pl. 342.
Tringoides macularius, Cassin, Gen. Rep. 735.

The Spotted Sandpiper forms almost the only exception to the general rules, that the species of this family retire to very high latitudes to rear their young, and on their return south in the fall associate in flocks of greater or less extent. It has a breeding range almost unparalleled among the Sandpipers, rearing its young from as far south, at least, as Washington, D. C., to the confines of the Arctic circle. Nor is it confined to the immediate vicinity of the sea; it abounds along the rivers and creeks of the interior, and shows a marked predilection for the vicinity of man's abode. The nest is usually placed in an orchard or meadow, often in a ploughed field, and is a mere depression in the ground, lined with a few dried grasses, or a little eel-grass, (*Zostera.*) The eggs, as usual in this family, are four in number, large for the size of the bird, pointed, and of a light cream color, every where blotched and spotted with dark brown and black. A nest found on the 4th of July, on one of the barren islands off the coast of Labrador, contained eggs in which the embryos had scarcely begun to be developed, while on the 17th of June, eggs found at Portsmouth, N. H., were on the point of hatching.

The Spotted Sandpiper is at all times a solitary species; it is rare to see more than two or three together. Its note is a low mellow "weet," often repeated. When wounded, even if very severely, it dives with great facility and quickness, and sometimes swims a considerable distance under water. Its most peculiar trait, however, is the habit it possesses of always, on alighting, and frequently at other times, balancing its tail in a remarkable manner, just as the Solitary Sandpiper, *Rhyacophilus solitarius*, does its head. This peculiarity has gained for it the common appellation of "Teeter-tail."

TRYNGITES RUFESCENS (Vieill.) Cab.—Buff-breasted Sandpiper.

Tringa rufescens, Aud., Birds Amer. v. 264, pl. 331.
Tryngites rufescens, Cassin, Gen. Rep. 739.

A single specimen of this rather uncommon Sandpiper was shot on the 20th of August by one of the sailors, but was unfortunately too much mutilated to be preserved. I learned nothing of its habits; it is probably a rare bird in Labrador.

NUMENIUS (NUMENIUS) LONGIROSTRIS Wils.—Long-billed Curlew. "Sickle-bill."

Numenius longirostris, Aud., Birds Amer. vi. 35, pl. 355. Cassin, Gen. Rep. 743.

Although I did not meet with this species myself, I was assured by all the hunters that it is occasionally seen among the vast flocks of the *N. borealis* that appear in the autumn. It is, however, rare in Labrador. It is known by the very suggestive name of "Sickle-bill."

NUMENIUS (PHAEOPUS) HUDSONICUS Lath.—Hudsonian Curlew. "Jack Curlew."

Numenius Hudsonicus, Aud., Birds Amer., v. 42, pl. 356. Cassin, Gen. Rep. 744.

Of the Hudsonian Curlew I saw but few individuals, and these were so shy that it was with difficulty that they were procured. They were most numerous at the time that the *N. borealis* were about taking their departure; and in their general manners, food, &c., appeared to be very similar to the latter. Their voice, however, is much louder and rougher. They are known to the natives as "Jack Curlews."

NUMENIUS (PHAEOPUS) BOREALIS (Forst.) Lath.—Esquimaux Curlew. "The C'lew."

Numenius borealis, Aud. Birds Amer., vi. 45, pl. 357. Cassin, Gen. Rep. 744.

From the time of my first arrival in the country until the second week in August, the stereotyped reply of the inhabitants to my inquiries concerning game was, "There is nothing to shoot yet, sir; the *C'lews* have not yet arrived; but when they come you will have fine sport." All were agreed as to the abundance of the birds, the facility with which they could be obtained, the sport of killing them, and their delicacy on the table. Naturally enough, when disappointed in procuring other birds, our thoughts turned to the Curlews, and we endeavored to console ourselves by shooting them in anticipation. It was not, however, until the 16th of August, when in the romantic harbor of "Indian Tickle," that we obtained the first glimpse of the Curlews. Five days later, at Henley Harbor, our sport commenced; the Curlews were there in immense numbers, and for nearly two weeks we all enjoyed such sport as almost made us forget our disappointments and hardships on the dreary Labrador coast. The Curlews then disappeared as suddenly as they had arrived; not, however, until I had had ample opportunities of studying their habits, and had procured a sufficient number of specimens.

The Esquimaux Curlew arrived on the Labrador coast from its more northern breeding grounds in immense numbers, flying very swiftly in flocks of great extent. These immediately broke up into smaller companies, and proceeded at once in search of food. They remained but a very short time. As Audubon most correctly says, "I was not long in discovering that their stay on this coast was occasioned solely by the density of the mists, and the heavy gales that already gave intimation of the approaching close of the summer; for whenever the weather cleared up a little, thousands of them set off and steered in a straight course across the broad Gulf of St. Lawrence. On the contrary, when the wind was high and the fogs thick, they flew swiftly and low over the rocky surface of the country, as if bewildered. Wherever there was a spot that seemed likely to afford a supply of food, there the Curlews abounded and were easily approached." His observations, however, differ much from mine, in reference to the time of the arrival and departure of the birds. He states that they made their first appearance on the 29th of July, and had all left by the 12th of August; whereas, I saw none until about that latter date, and none were to be seen on the first of September. For two or three days before their final departure, we had noticed them all moving directly southward, flying very high in the air in loose straggling flocks, with a broad extended front.

The Curlews associate in flocks of every size, from three to as many thousands, but they generally fly in so loose and straggling a manner, that it is rare to kill more than half a dozen at a shot. When they wheel, however, in any of their many beautiful evolutions, they close together in a more compact body, and offer a more favorable opportunity for the gunner. Their flight is firm, direct, very swift, when necessary much protracted, and is performed with rapid regular beats. They never sail except when about to alight; then the wings are much incurved downwards, in the manner of most Waders. As their feet touch the ground their long, pointed wings are raised over the back until the tips almost touch, and then deliberately folded, much in the manner of the Solitary Sandpiper, *Rhyacophilus solitarius*. Their note is an oft-repeated, soft, mellow, though clear whistle, which may be easily imitated. By this means they can readily be decoyed within shot, if the imitation is good and the gunner is careful to keep concealed. The smaller the flock, the more easily are they allured, and a single individual rarely fails to turn his course toward the spot from whence the sound proceeds. When in very extensive flocks they have a note which, when uttered by the whole number, I can compare to nothing but the chattering of a flock of blackbirds. When wounded and taken in hand, they emit a very loud harsh scream, like that

[Aug.

of a common hen under similar circumstances, which cry they also utter when pursued.

Their food consists almost entirely of the Crow-berry, *Empetrum nigrum*,* which grows on all the hill-sides in astonishing profusion. It is also called the "Bear-berry" and "Curlew-berry." It is a small berry, of a deep purple color, almost black, growing upon a procumbent, running kind of heath, the foliage of which has a peculiar moss-like appearance. This is their principal and favorite food; and the whole intestine, the vent, legs, bill, throat, and even the plumage are more or less stained with the deep purple juice. They are also very fond of a species of small snail, that adheres to the rocks in immense quantities, to procure which they frequent the land-washes at low tide. Food being so abundant, and so easily obtained, they become excessively fat. In this condition they are most delicious eating, being tender, juicy, and finely flavored; but as might be expected, they prove a very difficult job for the taxidermist.

Although the Curlews were in such vast numbers, I did not find them so tame as might be expected, and as I had been led to suppose by previous representations. I was never able to walk openly within shooting distance of a flock, though I was told it was often done. The most successful method of obtaining them is to take such a position as they will probably fly over in passing from one feeding ground to another; they may then be shot with ease, as they rarely fly high at such times. The pertinacity with which they cling to certain feeding grounds, even when much molested, I saw strikingly illustrated on one occasion. The tide was rising and about to flood a muddy flat of perhaps an acre in extent, where their favorite snails were in great quantities. Although six or eight gunners were stationed on the spot, and kept up a continual round of firing upon the poor birds, they continued to fly distractedly about over our heads, notwithstanding the numbers that every moment fell. They seemed in terror lest they should lose their accustomed fare of snails that day. On another occasion, when the birds had been so harassed for several hours as to deprive them of all opportunity of feeding, great numbers of them retired to a very small island, or rather a large pile of rocks, a few hundred yards from the shore, covered with sea weed, and, of course, with snails. Flock after flock alighted on it, till it was completely covered with the birds, which there, in perfect safety, obtained their morning meal.

I was told that the Curlews were never seen in Labrador, except for the short period in the autumn. Such, however, I do not think to be the case, particulary as Audubon, upon good authority, asserts to the contrary. It is probable that the celerity and silence with which it passes northward during the spring migration, causes it to be partially overlooked. Its migrations are very extensive, but performed so quickly and silently that it is rarely seen south of the New England States. It is found in Texas; though as far as my knowledge extends, it does not breed much south of Hudson's Bay. In Labrador it is known by its proper name, which, however, is invariably shortened into "C'lew." Further south it is called the "Dough-bird;" but this name is also applied to other birds. In a great number of specimens I found considerable differences in size, in the color of the under parts, which varies from creamy white to deep buff, and in the purity and extent of the white patch on the throat. These differences, however, were not indicative of sex, nor even of age, so far as I could ascertain.

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* "EMPETRUM, Tourn. Flowers polygamous, scattered and solitary in the axils of the leaves, (inconspicuous) scaly-bracted. Calyx of 3 spreading and somewhat petal-like sepals. Stamens, 8. Style very short; stigma 6-9 rayed. Fruit, a berry like drupe, with 6-9 seed-like nutlets, each containing an erect anatropous seed. *E. nigrum, L.* Procumbent and trailing; leaves linear oblong, scattered; fruit black."—(Gray's Manual of Botany, College Ed. p. 393.)

BERNICLA CANADENSIS (L.) Boie.—Canada Goose.

Anser Canadensis, Aud., Birds Amer. vi. 178, pl. 376.
Bernicla Canadensis, Baird, Gen. Rep. 764.

No Wild Geese were observed until the second week in August, when for several days we saw them fly southward in small flocks, keeping at a great height in the air, and always preserving a wedge-shape form. No specimens were procured.

ANAS BOSCHAS Linn.—Mallard.

Anas Boschas, Aud., Birds Amer. vi. 236, pl. 385.
Baird, Gen. Rep. 774.

Audubon, in his account of this Duck, says "On the western coast of Labrador, none of the inhabitants we conversed with had ever seen the Mallard, and in Newfoundland the people were equally unacquainted with it, the species being in those countries replaced by the Black Duck, *Anas fusca*." Although it is a rare species in Labrador, I ascertained its existence there from a very fine pair offered for sale by one of the natives. In the interior of the continent it goes as far north at least as Great Slave Lake, where it breeds in considerable numbers.

ANAS OBSCURA Gm.—Dusky Duck. "Black Duck."

Anas obscura, Aud., Birds Amer. vi. 244, pl. 386.
Baird, Gen. Rep. 775.

The Dusky Duck is by far the most abundant of the *Anatinæ* along the coast of Labrador, where it breeds very plentifully. Though some times seen along the rocky and barren islands that skirt the coast, it at all times shows a decided preference for the ponds and streams of the interior. When the females are incubating, and engaged in rearing their young, the males desert them, and retire to secluded situations to renew their feathers. Some which I shot on the 23d of July were at that time in deep moult, and entirely unable to fly, though they made their way over the water with astonishing celerity. I saw young nearly half grown on the 1st of August; they were at that time still led about by the parent, and were unable to fly. It is a remarkably shy and watchful bird, so much so that it is only with great difficulty it can be procured. It is much esteemed as an article of food, and is known to the inhabitants as the "Black Duck."

NETTION CAROLINENSIS (Gm.) Baird.—Green-winged Teal.

Anas Carolinensis, Aud., Birds Amer, vi. 281, pl. 392.
Nettion Carolinensis, Baird, Gen. Rep. 777.

Though the Green-winged Teal is a rare bird along the coast of Labrador, yet Audubon is incorrect in saying that it is never found there. A specimen which I saw in a collection of birds at Rigolet, proves its existence in that country. It is abundant in the interior, breeding in the region around Great Slave Lake.

NETTION CRECCA (L.) Kaup.—English Teal.

Nettion crecca, Baird, Gen. Rep. 778.

I was so fortunate as to procure a well characterized specimen of this Teal, which, though a common bird in Europe, is only known in North America as a rare straggler from that country. It is closely allied to the Green-winged Teal, but is nevertheless perfectly distinct, the differences being readily appreciable even without comparison. These consist in the entire absence of the white crescent before the wing; the more conspicuously colored elongated scapulars, which are deep black and pure creamy white; and the remarkable distinctness of the white lines on the head. I learned nothing of its habits.

[Aug.

CAMPTOLÆMUS LABRADORIUS (Gm.) Gray.—Labrador Duck. "Fool-bird."

Fuligula Labradora, Aud., Birds Amer. vi. 329, pl. 400.
Camptolæmus Labradorius, Baird, Gen. Rep. 803.

I did not succeed in procuring or even meeting with this rare and very remarkable Duck. I was informed that, though it was very rarely seen in the summer, it is not an uncommon bird in Labrador during the fall; it is known by the peculiar appellation of "Fool-bird," a name given on account of its remarkably unsuspicious nature, which renders it easy to approach. The name, however, can scarcely be a general one. Further than this I learned nothing respecting it.

PELIONETTA PERSPICILLATA (L.) Kaup.—Surf Duck. "Bottle-nosed Coot."

Fuligula perspicillata, Aud., Birds Amer. vi. 337, pl. 402.
Pelionetta perspicillata, Baird, Gen. Rep. 806.

The Surf Duck is an abundant bird along the coast of Labrador, where a good many breed, though perhaps a greater number go still further north. They are seen in flocks of considerable extent, especially during the renewal of their feathers, at which time they collect in great numbers along the shores of the bays and inlets. On the 3d of August, while sailing up Esquimaux Bay, the shore for nearly a mile was lined with these Ducks, and the succeeding species. They were all in deep moult, and most of them unable to fly, and yet were so wary and vigilant, that few were obtained, for they dived at the flash of the gun with such celerity as to escape the shot. They are tough birds, and remarkably tenacious of life, and require a heavy charge to kill them. Those procured were excessively fat, but their flesh was rank and oily. They are known as "Bottle-nosed Coots," a name given in alluslon to the very peculiar shape and color of the bill.

MELANETTA VELVETINA Baird.—Velvet Duck. "White-winged Coot;" "Brass-winged Diver."

Fuligulu fusca, Aud., Birds Amer. vi. 332, pl. 401.
Melanetta velvetina, Baird, Gen. Rep. 805.

This species is nearly if not quite as abundant as the preceding, with which it is often found associating. It appears to possess much the same habits. It is a very shy and vigilant species, and possesses powers of diving surpassed by few birds. It is known by the names of the "White-winged Coot" and "Brass-winged Diver," the former being the most usual appellation.

Though I did not meet with the American Scoter, *Oidemia Americana*, I was assured that it breeds in the neighborhood of Esquimaux Bay. It is known as the "Black Coot" and "Butter-billed Coot." The three species of *Oidemieæ* are all called "Coots;" a nomenclature that puzzled me not a little, until I ascertained to what birds the names referred.

SOMATERIA MOLLISSIMA (Linn.) Leach.—Eider Duck. "Sea-duck."

Fuligula mollissima, Aud., Birds Amer. vi. 349. pl. 405.
Somateria mollissima, Baird, Gen. Rep. 809.

The Eider Duck, so widely and justly celebrated for the valuable down which it furnishes in such quantity as to make it a profitable article of commerce, is the most abundant Duck throughout the extent of Labrador, which is with it a favorite breeding place. For although many breed in very high latitudes on both sides of the Atlantic, yet Labrador, from the peculiar nature of its coast, seems a country specially adapted to its wants. It also finds there a safer place of retreat while engaged in the duties of incubation, since, at least as far as I can ascertain, its down is not so regularly sought for as it is in some other countries. Wherever found at all it is an abundant species; but on the American coast it is seldom or never seen south of Long Island or the New Jersey Capes.

The Eiders choose for their breeding places the low, rocky, barren islands that stud the Labrador coast, generally giving the preference to those which are more or less covered with grass and low scrubby juniper. The nests are always placed on the ground; often a tuft of grass is selected, or the nest is hidden beneath the spreading boughs of juniper. The grassy crevices between flat strata, and the soft beds of moss at the foot of over-shadowing rocks are also favorite situations. The nest is of rather bulky construction, formed of moss, lichens, and dried grasses and seaweed, loosely matted together, and the whole fabric sunk as deeply as possible into the ground. The down is seldom, I think, added until the full complement of eggs is made up. These rarely exceed five or six in number, and occasionally are but four. They vary much in size and shape, and also considerably in color. They average about three inches in length by two in breadth, and the shape varies from an almost perfect ellipse to a regular ovoid or ovate. The ground color is a dull olive green, frequently with a bluish, and sometimes with a creamy tinge; and is often discolored with darker patches, like stains. The shell is smooth and polished. The eggs are excellent eating, as I know to my cost; for having on one occasion collected a large basketful, all those that were fresh and could be neatly blown, were appropriated by the sailors during a temporary absence.

While the female is incubating she permits a very near approach before she forsakes her nest; it is not uncommon to walk up to within a few feet of the sitting bird; she then flaps off in a hurried frightened manner, but always in silence, and makes directly for the nearest water. If a gun be fired on a small island, where many birds are sitting, all immediately leave their nests and collect in a body at some distance on the water. There they wash and plume themselves until the intruder withdraws, when they soon resume their duties.

There seems to be considerable difference in the time of laying the eggs. On the 4th of July, when I made most of my observations on these birds, I found nests in which the full complement had not yet been laid; eggs with chicks in all stages of developement; and broods of young were seen, led about on the water by the parent. As soon as the ducklings are hatched, they are led directly to the water, where they swim with perfect ease and dive with facility. The mother keeps them close about her, anxiously watching for every appearance of danger that might befal them, and ready at any moment to give battle to any hungry gull that might attack them. Under these circumstances only did we ever succeed in openly rowing within shot of an Eider, when anxiety for the safety of her brood made her forget her own danger. On such occasions, the mother, keeping them close together, would urge them forward until the danger became too imminent, when at a single note, the young would scatter and dive with astonishing celerity, and the mother dive or fly off as necessity required. The ducklings at this time are covered with long hair-like down, very fine, of a dusky brown above and light silvery grey below.

As soon as the females begin to deposit their eggs, they are deserted by the males, and from this time the whole care of incubation and rearing the young devolves upon the former. The males, at this season, assemble in large flocks, and retire to the outer and most secluded islands during the time of the renewal of their feathers. They are excessively shy and difficult to approach. The females, even those which are sterile, never, I believe, associate with the males, but keep in flocks by themselves.

There is a great difference in the colors of the plumage of the females at different ages, varying from very light ochreous to a uniform dark chestnut brown, much as represented in Audubon's plate. They are universally known as "Sea-ducks," the males being always distinguished as "Sea-drakes." I seldom or never heard the name of Eider applied to either sex by the natives.

[Aug.

I saw no individuals of the King Eider, *Somateria spectabilis*, during my stay; but was informed that in the fall they are not unfrequently met with.

MERGUS SERRATOR Linn.—Red-breasted Mergauser. "Shell-drake."

Mergus serrator, Aud., Birds Amer. vi. 395; pl. 412. Baird, Gen. Rep. 814.

The Red-breasted Mergauser breeds very abundantly along the Labrador coast, while the Buff-breasted, *M. Americanus*, is seldom or never seen. The females place their nests on much the same islands as the Eiders choose, but conceal them more carefully in the tall grass, or among thick scrubby juniper. The nest is rather neatly and compactly formed of mosses, lichens, and dried sea weeds, and warmly lined with down plucked from the breast of the mother, with which the eggs are nearly covered. The full number of these is nine or ten; incubation does not take place until late in the season, as I have found them nearly fresh on the 4th of July. They are regularly oval or ellipsoidal in form, and of a uniform light buff color. When the bird is surprised on the nest, she steals off as quietly as possible, and retires to a considerable distance. While the females are engaged in incubation, and in rearing their young, the males collect in small flocks and keep entirely by themselves, and are excessively shy and vigilant. I found young birds, apparently about a week old, on the 1st of August. Although so young, they were perfectly at home on the water, swimming with ease and grace, and diving with such celerity that it was with difficulty that three or four were procured.

GRACULUS DILOPHUS (Sw.) Gray. Double-crested Cormorant. "Shag."

Phalacrocorax dilophus, Aud., Birds Amer. vi. 423: pl. 416.
Graculus dilophus, Lawrence, Gen. Rep. 877.

As I had no opportunity of visiting any of the colonies of Cormorants, either in Labrador or Newfoundland, I can say nothing concerning their habits. I was informed that there was a "Shag settlement" (either of this species or the *G. carbo*,) near Sloop Harbor, a short distance south of Little Mecattina. A fine specimen of this species was presented to me by Capt. Dodge. Both this and the *G. carbo* are universally known as "Shags."

SULA BASSANA (L.) Briss.—Gannet.

Sula bassana, Aud., Birds Amer. vii. 44; pl. 425. Lawrence, Gen. Rep. 871.

On the first of July our proximity to the celebrated Gannet Rocks was clearly indicated by the numbers of these birds seen flying in every direction, engaged in seeking for food, which consists principally or wholly of fish. When satiated with food they are unable to fly for some time. We passed by one in this condition; it flapped heavily along on the surface of the water, trying in vain to rise, yet managing, with aid of wings and feet to proceed with considerable speed. Again, on the 11th of September, on our return we saw many Gannets; but though on both these occasions we passed within fifty miles or less of the rocks, I was denied the pleasure of observing the birds at their great breeding place, and can only speak of their flight and mode of fishing. They fly with firm, powerful beats, alternately sailing and flapping for about equal distances, and their flight is strong and capable of being greatly protracted. When searching for food, they fly slowly along at the height of a few yards above the surface, reconnoitering the water beneath. When a fish is espied, the bird poises an instant in the air and then darts suddenly down, the weight of its ponderous body giving it an impetus which sends it far under water, and raises the spray in a cloud around it. Taking advantage of this habit, Gannets are sometimes captured by fastening a fish to a soft plank, and sinking it just below the surface. The velocity with which the bird descends forces its bill through the wood, and it is thus made a prisoner.

PROCELLAIRA (FULMARUS) GLACIALIS Linn.—Fulmar Petrel.

Procellaria glacialis, Aud., Birds Amer. vii. 204; pl. 455. Lawrence, Gen. Rep. 825.

On the 19th of August, while at sea off Belle-Isle, many Fulmars were seen, mostly resting on the water in companies of about a dozen. They generally remained quiet until we approached within sixty or seventy yards, when they would all take flight. In rising from the water the wings are lifted high over the back, the feet drawn under the belly, and with one vigorous spring and a flap at the same instant, the bird launches itself into the air. Its flight is extremely firm, vigorous and protracted, performed with slow measured beats. One individual was overtaken by our vessel, so loaded with food as to be unable to fly; it passed close by the side swimming as fast as possible, near enough to enable me to clearly discern the peculiar character of the nostrils which distinguishes this family of birds.

THALASSIDROMA (OCEANITES) WILSONI Bon.—Wilson's Stormy Petrel. "Mother Carey's Chickens."

Thalassidroma Wilsoni, Aud., Birds Amer. vii. 223; pl. 460. Lawrence, Gen. Rep. 831.

Many of these little oceanic wanderers, and probably also the *Thal. Leachii*, and *pelagica*, were seen every day during our voyage, until we entered the Gulf of St. Lawrence. After that few were observed, and none at all seen off the coast of Labrador. They probably breed along the coast of Nova Scotia. They are very familiar unsuspicious little birds, fluttering hither and thither close around a vessel to pick up the bits of floating garbage which forms their favorite food, and never showing the slightest fear. When about to pick up any floating substance, they raise the wings high over the back, flapping them lightly, and stretch the feet downwards to their fullest extent; the moment they touch the water, the morsel is secured, and the bird is off again in an instant. This attitude is represented to the life in Audubon's beautiful plate of the Least Petrel. Their flight is light, graceful and buoyant in the extreme, and their power of remaining long at a time on the wing is unsurpassed. Three or four are generally seen at a time, though when pressed by hunger they sometimes collect in great numbers about a vessel, eagerly searching for food. On one occasion, about dusk in the evening, we came upon a company of about thirty of them, collected together in a compact flock, sporting high in the air with most graceful movements, like so many swallows over a pond. What had attracted them I could not ascertain. These birds may be caught by means of a hook baited with a morsel of pork; but such is the antipathy of sailors to destroying them, that they are seldom molested. I am informed by my friend, Dr. H. Bryant, of Boston, that he has caught them by allowing a long filament of silk to float in the air behind a sailing vessel, with which the wings of the birds become entangled as they flutter against it. All three species of Petrels are universally known as "Mother Carey's Chickens."

PUFFINUS (ARDENNA) MAJOR (Faber) Bon.—Greater Shearwater. "Hagden."

Puffinus cinereus, Aud., Birds Amer. vii. 212, pl. 456.
Puffinus (*Ardema*) *major*, Lawrence, Gen. Rep. 833.

Many Shearwaters were seen at different times during the voyage, generally singly, and always at a distance from land. They appeared to be shy and unfamiliar birds, none approaching near enough to enable me positively to determine the species, whether *P. major* or *anglorum*, though from their size I should suppose the former. On the 19th of August many were seen resting on the water in companies, in the manner of the Fulmars, *Procellaria glacialis*, to which they are nearly allied, both in form and general manners. Both species are known to sailors and fishermen as "Hagdens."

[Aug.

PUFFINUS (NECTRIS) FULIGINOSUS Strickl.—Sooty Shearwater. "Black Hagden."

Puffinis (Nectris) fuliginosus, Lawrence, Gen. Rep. 834.

On the 19th of August a few individuals of this easily recognizable species were seen in company with the *P. major*, to which in their habits they are probably very similar. They are known to the sailors as "Black Hagdens."

STERCORARIUS POMARINUS Temm.—Pomarine Jager. "Boatswain."

Lestris pomarinus, Aud., Birds Amer. vii. 186, pl. 451.
Stercorarius pomarinus, Lawrence, Gen. Rep. 838.

But very few individuals of this species were observed. I shot one which was hovering over the stern of the vessel, attracted by some floating garbage. I was surprised to see that it picked up floating substances more in the manner of a Petrel than of a Gull—descending slowly with the feet stretched downwards, and wings elevated, and scarcely touching the water. This Jager is known to sailors and fishermen as the "Boatswain," a name which is also applied to the *S. parasiticus*.

STERCORARIUS PARASITICUS Temm.—Arctic Jager. "Boatswain."

Lestris Richardsonii, Aud., Birds Amer. vii. 190, pl. 452.
Stercorarius parasiticus, Lawrence, Gen. Rep. 839.

I saw but a single individual of this species that I could identify with any certainty. It may be recognized in flight by the peculiar shape of its tail, intermediate between that of *S. pomarinus* and *cepphus* in the length of the middle tail feathers, which project some three inches beyond the others. The name of "Boatswain" is applied to this species as well as to the preceding. All the Jagers have received from the fishermen two very appropriate epithets, in allusion to the peculiar nature of their food, which, as is well known, consists principally of the partially digested fish which they force the Gulls to disgorge.

STERCORARIUS CEPPHUS (Brünn.)—Buffon's Skua. "Marlingspike."

Lestris parasitica, Aud., Birds Amer. vii. 192, pl. 453.
Stercorarius cepphus, Lawrence, Gen. Rep. 840.

Of this most beautiful and graceful of the Jagers I saw but very few individuals, and those only while at sea. It is easily recognized by the long slender feathers, which project six or eight inches beyond the others. From this peculiarity it has received the name of "Marlingspike" from the sailors. Its flight is extremely powerful, firm, even, and performed with regular beats, which propel it with great velocity. It never, I believe, sails. I had not the pleasure of witnessing its attacks upon the Gulls, in which it is said to display courage and intrepidity beyond all other species of the genus.

LARUS GLAUCUS Brünn.—Glaucous Gull. "Ice-gull."

Larus glaucus, Aud., Birds Amer. vii. 170, pl. 449. Lawrence, Gen. Rep. 842.

I saw but very few "Burgomasters" that I could positively identify, on the coast of Labrador, where they appear to be rather rare. They are probably more abundant in higher latitudes. I was informed by an intelligent hunter, who seemed to be acquainted with all the large birds, that there was a "colony" of the "Ice-gulls," as they are called, on some small islands known as the Herrings, about twenty-five miles off the coast, just opposite the entrance of Esquimaux Bay. Unfortunately, however, I had no opportunity of verifying the statement, or of observing the habits of this magnificent Gull during the breeding season.

LARUS MARINUS Linn.—Great Black-backed Gull. "Saddle-backed Gull." "Saddler."

Larus marinus, Aud., Birds Amer. vii. 172, pl. 450. Lawrence, Gen. Rep. 844.

The Great Black-backed Gull, which, with the single exception of the Glaucous Gull, is the most powerful of its tribe, is a very abundant bird during the summer months along the whole coast of Labrador. Indeed, this is almost the only locality on this side of the Atlantic where its habits during the breeding season can be successfully studied; the peculiar character of the coast renders it well adapted to the wants of the birds, and it is therefore their favorite breeding place. I was informed that it arrives there about the latter part of May, but with reference to its time of departure, I cannot reconcile my observations with those of Audubon. He states that "by the 12th of that month (August) they had all left Labrador;" whereas, I found them still numerous on the first of September, and I think I never saw so many of both old and young as I did at Henley Harbor on the 30th of August. At what time they really do depart, or whether any remain all winter, I am unable to say. I can account for this and many other discrepancies between our observations with respect to date, only by supposing the season in which Audubon visited the country was a very early one, or that last summer was remarkably delayed.

This species generally chooses for the situation of its nest one of the many small islands, some of them mere rocks jutting out of the water, which everywhere stud the Labrador coast; and contrary to the usual habit of Gulls, it does not congregate in large numbers upon a single island, not more than two or three nests being commonly placed together. It sometimes, however, mixes with the Herring Gulls, for among several hundred of the latter, which circled high over our heads when we invaded their territories, I never failed to detect a few of the Black-backed. I was surprised to find it breeding on some inland ponds, (there also in company with the Herring Gulls,) the nests being placed on small rocks jutting out of the water. In these situations I have thought them less shy than when breeding on islands open to the sea. The nest is large and bulky, composed of moss and lichens scraped into a heap, the cavity apparently formed by the weight of the bird. They are rather shallow for the width, which is nearly or quite two feet externally. The eggs are three, as is usual among the Gulls and Terns, and differ much in size, shape and color, even in those taken from the same nest, some being smaller than the average of Herring Gulls, though they are usually proportionately larger.

On the 4th of July three young birds of this species, apparently but a few days old, were procured and placed in a basket together with a number of Herring Gulls of about the same age. Even thus early they evinced their superiority in size and strength over the other species, for, on looking at them next morning, I found that, their quarters being rather crowded, they had trampled to death every one of the others, and were standing triumphantly over the mass of dead bodies, calling loudly for food. When fed they exhibited the greatest voracity and gluttony, each devouring at a meal three or four capelin some six inches long, which they could swallow whole, and they quarrelled and fought continually for choice morsels. Two of these birds were left in charge of a fisherman at Henley Harbor, and on our return, about seven weeks afterwards, they had grown to fully the size of the adults, and were magnificent birds and great favorites. They kept their plumage perfectly clean and in good order, and were very tame. They were then mottled all over with spots of dusky, most of the primaries, and a subterminal band on the tail, black; bill entirely black, legs and feet light flesh color. This is the plumage in which these Gulls remain the greater part of the first year. One of the birds was much larger and stronger than the other, which it tyrannized over continually and kept in perfect subjection. Both uttered frequently a whining noise, especially when hungry; which state, however, seems to be the normal condition of all Gulls, both young and old.

[Aug.

The Black-backed Gulls surpass all birds with which I am acquainted in their shyness and wariness, which are so excessive that it is only by stratagem that they can be procured. But two were shot by any of the party, both being killed with guns exceeding in their range those to which the birds were accustomed. They always fly at a great height over the water, and never alight except in open situations which they have previously cautiously examined. Their flight is firm, extremely powerful, performed with measured beats, and is capable of being greatly protracted. They can force their way against the strongest gales. Their food is principally fish of various kinds, though they do not refuse offal of any description. To procure fish they hover at a height of a few yards over the surface, and when one is espied drop heavily upon it, not, however, closing the wings, which are elevated and flapped rapidly to support them. They seldom or never dive, but on such occasions are frequently partially immersed.

During the breeding season the birds are very noisy and clamorous, continually uttering their loud, harsh, rough cries. These are of three distinct kinds; the first, their usual call, is a loud, rough, sonorous "kaw-awk," aptly designated by Audubon as a "furious laugh." They have also a short kind of bark, resembling the syllables "hac-hac-hac;" and in addition to these a loud harsh scream, uttered when their territories are invaded. On the 31st of July I saw a large number of these Gulls collected on the water some ten miles up Esquimaux Bay, where they filled the air with their loud continued cries, which could be distinctly heard at a distance of nearly a mile.

This Gull is universally known to the natives, as well as to sailors and fishermen, as the "Saddle-backed Gull," or, quite as frequently, simply "Saddler." I have never heard applied to it the name of "Coffee-carrier," said to be the title by which it is designated along the coast of New England.

LARUS ARGENTATUS Brünn.—Herring Gull. "Blue Gull."

Larus argentatus, Aud., Birds Amer. vii. 163, pl. 448. Lawrence, Gen. Rep. 844.

The Herring or Silvery Gull is by far the most abundant of the Gulls along the Labrador coast, where it breeds in great numbers, spending the summer months there, and not retiring at least until the second week in September. They were as abundant as ever on the first of that month, when I noticed great numbers of both old and young. I cannot, therefore, comprehend the statement of Audubon, where, in his account of *Larus marinus*, he says: "No individuals of *Larus argentatus* were, to my knowledge, seen on that coast (Labrador) during the three months that I passed there, and the fishermen told us that the 'Saddle-backs were the only large Gulls that breed there.'" On many of the innumerable small islands which form a belt six or eight miles deep along the coast in the neighborhood of Little Mecattina, and southward, immense companies of these Gulls had assembled to breed; and at Esquimaux Bay I found them breeding on the small ponds of the interior. They are every where known to the natives as "Blue Gulls."

On the 4th of July, at Sloop Harbor, I had an opportunity of visiting many islands where these Gulls were breeding in great numbers. On approaching one of the islands, where the birds were sitting quietly on their nests, or walking leisurely about, when we were still several hundred yards distant, they all left their nests, and with loud discordant screams, indicative of their anger at being disturbed, circled high over our heads far beyond the range of our guns. I found the nests placed on the ground in the most irregular manner, apparently without the slightest choice as to situation, except that they seemed to prefer the moss-covered rocks and dry bare spots, the grassy patches being appropriated by the few Eiders that bred on the same island. And here let me remark, that on those low grassy islands where the Eiders were most numerous, but few Gulls built their nests; and *vice versâ*, on those bare islands where the Gulls had collected in great numbers, we found but few nests of the

Eiders, though the two birds mix to some extent. The nests were large and bulky, composed of dried grass, moss and lichens scraped into a heap, the cavity formed apparently by the weight of the bird. The eggs, in every instance that came under my observation, were three, but varied surprisingly in size, color and markings, and also considerably in shape. They average rather more than two inches and three-quarters in length, by nearly two in greatest diameter, being thus rounded and obtuse. The ground color varies from a light bluish or greenish white to deep brownish olive; and the spots are of every size and shape, very irregularly disposed. I found eggs at that date in every stage of development, some being quite fresh, but in the majority the embryos were nearly fully formed. On the same day many young were procured, being caught as they skulked and hid beneath stones, or scrambled off over the luxuriant moss. In no instance did I observe any on the nests. At this period they presented a very curious appearance; they were ugly and misshapen, covered with thick whitish down, every where mottled with angular spots of dusky, and, on the whole, looked more like lumps of dirty carded wool than any thing else. When taken in hand they bit and scratched with all their strength, at the same time squealing loudly. Although these cries brought the parents a little nearer, none ventured within shot. On being placed on the water they swam with ease, and appeared to be perfectly at home. Soon after being caught they fed freely on fish and scraps of pork, and uttered constantly a whining noise. The first night, however, they were all trampled to death by some Black-backed Gulls placed in the same basket.

At Henley Harbor, during the latter part of August, many birds of the year were seen. They were at this time readily distinguishable from the adults, for besides being smaller, they were entirely of a deep dusky color, darkest below, and with the bills nearly black. One of these, slightly wing-tipped, showed considerable spirit, biting the finger placed incautiously within its reach, and ejecting the contents of its stomach—principally lance—with remarkably accurate and vindictive aim. The lance seems to be the favorite and principal food with this and other Gulls, and many were always to be seen fishing for them at the mouth of the harbor. To procure them they hover at a height of a few yards over the surface and drop suddenly down when a fish is discovered; never, I believe, diving, though they are often partially immersed. They rise again immediately, and the operation is repeated indefinitely, their hunger never seeming to be appeased. I have seen more than a hundred of these Gulls and the great Black-backed and the Ring-billed fishing together, but never noticed the slightest sign of any quarrelling or difficulty between them.

The Herring Gull requires three years to arrive at full maturity. During the greater part of the first year they are much as described above. The dusky gradually grows lighter, and by the second year the bird is white, mottled with dusky about the head and neck; the tail mostly black, the primaries black, as yet without spots, and the "gull-blue" replacing the grey mottling of the wings and back in irregular patches; the bill light flesh color, with a broad black band near the end. By the next winter the bird is perfect, except some slight mottling about the head and neck, and the following spring is in full plumage. I am enabled to give the above descriptions from specimens sent me from near Hampton, N. H., by Mr. Charles Perkins, shot about the first of December. They must moult very late, as some of these specimens had the quills only partially grown out. I am unable to say whether any breed in the immature plumage.

The abundance of this gull every where during its extensive migrations, cause its voice, flight and general manners to be so well known, that a detailed account of them is rendered unnecessary.

LARUS DELAWARENSIS Ord.—Ring-billed Gull.

Larus zonorhynchus, Aud., Birds Amer. vii. 152; pl. 446.
Larus Delawarensis, Lawrence, Gen. Rep. 846.

Three specimens of this small Gull were obtained at Henley Harbor on the

21st of August. They were all birds of the year, being every where mottled with dull greyish; the primaries and a broad terminal band on the tail black, as is also the terminal third of the bill, the rest being light flesh color. They were shot while busily engaged in fishing for lance, which seemed to form their favorite food. On skinning them, I found the gullet and stomach filled with the fish. They were not at all shy; they permitted a near approach without desisting from their occupation, and the three were shot in rapid succession before the rest became alarmed and flew off. Indeed, I have often thought that the wariness of Gulls is in exact proportion to their size. Thus the little Hooded Gulls, and the Kittiwakes, are so familiar as to hover and sport near the stern of a vessel; the Ring-bills come next, and though not so unsuspicious as the last, are by no means shy; the Herring Gulls, the next in size, are much more watchful and difficult to procure, while the Black-backed and Glaucous Gulls evince such excessive wariness and caution that it is only by stratagem they can be procured. Though the theory may not hold good in all cases, I certainly saw no exceptions to it during my stay in Labrador.

CHROICOCEPHALUS PHILADELPHIA (Ord.) Lawr.—Bonaparte's Gull.

Larus Bonapartei, Aud., Birds Amer. vii. 131; pl. 442.
Chroicocephalus Philadelphia, Lawrence, Gen. Rep. 852.

Many of these beautiful little Gulls were seen at different times during the voyage, though they were perhaps more abundant than elsewhere in the southern portions of the Gulf of St. Lawrence. It is not a little singular that the breeding places of a Gull so common, well known, and widely diffused as the present, should be still unascertained with certainty, and the egg almost unknown to science; yet such is the case. Though my opportunities of observing this species were limited, I could not but be struck with the remarkable familiarity and want of suspicion exhibited by it on all occasions. Numbers would often hover and sport around the stern of the vessel, so close that I could plainly see the dark spot behind the eye which characterizes the immature bird of this species. Their flight on such occasions, and indeed at all times, is extremely buoyant and graceful, in these respects resembling that of a Tern rather than of a Gull. I noticed that, while flying, individuals would scratch the head and neck with their claws, which operation, however, did not seem to impede their flight in the least. At that season (September) none were seen with the head enveloped in the hood which adorns both sexes during the breeding season. Those which I took to be birds of the year, had all a broad subterminal band of black on the tail, and in many the black of the primaries extended unbroken over the shoulder quite to the body.

RISSA TRYDACTILA (L.) Bon.—Kittiwake Gull.

Larus tridactylas, Aud., Birds Amer. vii. 146; pl. 444.
Rissa tridactyla, Lawrence, Gen. Rep. 854.

I met with this interesting Gull on but one occasion, which was on the 3d of August, while sailing up Esquimaux Bay several miles from its mouth. A small company hovered and circled over the boat, and a specimen was secured. Being only wing-tipped, it fluttered to some distance on the water, constantly uttering its piercing screams, which caused its comrades to hover over it for some time, showing their sympathy by loud cries.

STERNA WILSONI Bon.—Wilson's Tern. "Mackerel Gull."

Sterna Wilsoni, Aud., Birds Amer. vii. 97; pl. 433. Lawrence, Gen. Rep. 861.

During my short stay at Rigolet, I saw a good many of these Terns, but found none in any other locality. They possess in the extreme the buoyancy, gracefulness and ease of flight for which the whole family is so celebrated, performing the most beautiful evolutions without the least apparent effort. To obtain

their food, which, as far as I could ascertain, consisted chiefly of small fish, they hover lightly and slowly over the water at a height of a few feet. When a fish is espied, they nearly or quite close the wings and dart down with great rapidity, and usually go quite under water. With a slight shiver the beautiful birds shake the water off their plumage, swallow the fish as they reascend, and again hover eagerly watching for more. They were not at all shy. They are known to the natives by quite a variety of names. I have heard them called "Rapes," "Steerines," "Pathricks," and "Mackerel Gulls," the last being the name by which they and other Terns are known to the fishermen, given in reference to their forked tail.

COLYMBUS TORQUATUS Brünn.—Great Northern Diver. "Loon," "Loo."

Colymbus glacialis, Aud., Birds Amer. vii. 282; pl. 476.
Colymbus torquatus, Lawrence, Gen. Rep. 888.

This large, powerful and hardy bird is abundant throughout Labrador. It frequents chiefly the numerous ponds formed by the depressions of the rugged surface of the country, near the borders of which the nest is usually placed. Though numbers were seen, yet so shy, wary and vigilant is it, and so expert in eluding pursuit on the water by its extraordinary powers of diving, that not a single one was obtained by any of the party. The most successful method of procuring it is to lie perfectly concealed near the edge of the pond where it may be swimming, and to decoy it within shot by imitating its notes. The imitation, however, must be skilfully executed, or the wary bird will perceive the deception. The notes of the Loon, of all the birds with which I am acquainted, are the most wild, free and independent, seemingly uttered in full knowledge of the security which its wariness and vigor afford. It is from its cry that it derives its name of "Loon," or "Loo," as it is perhaps oftener pronounced by the natives. On the first of August, I came upon a pair of these birds on an inland pond, about three long gunshots wide; they had with them two young birds, apparently but a few days old. Perfectly aware of the safety of their position, they remained close together exactly in the centre of the pond, keeping the young between them, and at intervals sending forth their loud defiant screams. On being fired at, they simply ducked for a moment beneath the surface, and immediately rose again, and I was obliged to leave them to their occupations.

? COLYMBUS SEPTENTRIONALIS Linn.—Red-throated Diver.

Colymbus septentrionalis, Aud., Birds Amer. vii. 299; pl. 478. Lawrence, Gen. Rep. 890.

I obtained two eggs, supposed to be of this species, at Sloop Harbor, on the 4th of July; they were at that date quite fresh. The parent was seen but at a distance too great for positive identification. The nest was placed on the edge of a small pool of water, on a small barren island, and was very rudely constructed of dried rushes matted loosely together, on which the eggs were deposited without the slightest attempt at concealment. They measured two inches and nine-sixteenths in length, by one and eleven-sixteenths in breadth, and were of a uniform dark olive brown, with rather small spots of a very dark brownish black, and a few others of a lighter tint. They were much shorter and more rounded than undoubted eggs of *C. septentrionalis*, their form being regularly ovate, while that of the latter is nearly elliptical. The color was lighter. Very possibly they belonged to *C. Arcticus*.

ALCA IMPENNIS Linnæus.—Great Auk. "Penguin."

Alca impennis, Aud., Birds Amer. vii.; pl. 465. Cassin, Gen. Rep. 900.

Concerning this most extraordinary bird, remarkable in consequence of its not possessing the power of flight, and as being the sole representative in the

northern hemisphere of the numerous Penguins, (*Aptenodytes*) of the southern, I made diligent inquiry of every one who might be expected to have any knowledge of it. I was the more anxious to obtain some account of it from the fact of its being supposed to be nearly if not quite extinct; its introduction into the fauna of North America resting on very insufficient data. Though none of the natives of Labrador whom I interrogated had any knowledge of it, the fishermen knew immediately to what I referred when I spoke of "Penguins"—as they are called—and all with singular unanimity agreed in designating the Funks, an island off the south-east coast of Newfoundland as the only place where the birds were to be found. Yet I could never find a person who had actually *seen* one of the birds; they had only heard of them as Penguins. But the fact of their all agreeing as to the precise locality where the birds were to be found, seemed to me worthy of attention.

UTAMANIA Leach.

Gen. Ch.—Size moderate. General form stout, heavy, strong, compact; head moderate, neck short and thick, body heavy. Wings moderate; tail short; feet short and strong. Bill lengthened, about equal to the head, densely feathered for half its length, the feathers on the upper mandible extending much beyond the middle of the commissure, and nearly as far as those on the lower; very strong, much compressed, with several transverse grooves which are curved in the upper mandible. Upper mandible much deeper than the lower, with a moderately prominent basal ridge at base of the horny portion; the culmen regularly arched, tip considerably hooked and bent over the lower. Commissure very long, quite straight to near the tip where it is suddenly decurved. Gonys about straight. Nostrils linear, not pervious, moderately long, very narrow, situated just above the commissure on the feathered portion of the bill, immediately posterior to the lower corner of the basal ridge. Wings fully developed, admitting of flight, reaching beyond the base of the tail; primaries stiff, strong, somewhat fulcate, first longest. Tail short, pointed, rather stiffened, the feathers acuminate, central pair tapering and elongated. Legs short, stout and strong; tibia bare for a short space above the joint; tarsus shorter than the middle toe. Toes three, anterior, entirely united by a membrane. Claws all short, stout, blunt.

Colors.—Neck and upper parts brownish black; beneath white. A conspicuous white line from the eye to the summit of the basal ridge.

The essential characters of this genus lie in the wings, which are fully developed and admit of flight. By this alone it would be entitled to full generic rank, distinct from *Alca* with the type *A. impennis* L., were there no other characters involved. But one species, the *U. torda* Leach, is known, which is found abundantly in the more northern portions of both hemispheres, and is the most characteristic bird of those regions.

UTAMANIA TORDA Leach.—Razor-billed Auk. "Tinker."

Alca torda, Aud., Birds Amer. vii. 247; pl. 466.
Alca (*Utamania*) *torda*, Cassin, Gen. Rep. 901.

This, the most characteristic bird of marine arctic fauna, is remarkably abundant throughout the extent of Labrador. While in the Gulf of St. Lawrence, before reaching that country, numbers were every day seen flying rather low over the water, generally in single file, and sometimes passing very close around the vessel. At Esquimaux Bay, the most northern point visited, they were perhaps more numerous than elsewhere, breeding plentifully among the many thousands of Puffins there collected. I was credibly informed that they formerly bred in so great numbers on Backelew Island, off the coast of Newfoundland, that they received the name of "Backelew Birds;" an appellation I occasionally still heard applied to them, though they have entirely deserted the

island. Another small island on the east side of Esquimaux Bay, has in a like manner been deserted, the birds apparently having retired to the Puffin islands on the opposite side of the Bay. From these facts, I could not but conclude that the birds are slowly but surely retiring before the persecutions of man to more northern and inaccessible regions, though thousands still breed as far and farther south than Little Mecattina and the Murre Rocks.

It was at Sloop Harbor, on the third of July, that I first formed acquaintance with the Razor-billed Auks. As we dropped anchor in that sheltered cove, a large company of them were sitting at a little distance on a flat rock, crowded closely together, and all facing towards the sun, then low in the skies. They rested perfectly upright on their rumps, occasionally twisting their bodies in a curious jerking manner. No sooner, however, had our boat touched the rocky shore than they all instantly took flight and dispersed either singly or in small flocks. Although so watchful, they seemed to be not at all aware of the nature of the danger that threatened them, for they flew directly towards or past us as often as in any other direction, and numbers were easily shot. On the following day, the fourth of July, while searching for the eggs of the Eiders and Herring Gulls, I had abundant opportunity for observing their flight and general manners, for they bred in considerable numbers in the crevices of all the rocky islands in the vicinity.

Although the Razor-bills cannot be approached while sitting on the rocks, yet while flying they evince such a want of caution, or rather so much stupidity, as to fly continually directly over and past a boat at such short distances that they are easily shot down. But they are strong and tough birds and carry a great deal of shot, requiring a heavy charge to kill them. I have occasionally seen one fly off, apparently as strong as ever, leaving a cloud of white feathers floating in the air. When only one wing is broken they dive with great ease and celerity, and are then difficult to secure. When shot at and not touched, they open and shut the tail, swerve from their course and quicken their flight.

Though they are, I believe, entirely mute while flying, on being wounded and taken in hand they utter a loud, rough, hoarse cry, at the samet ime throwing themselves on their backs, fighting and scratching most furiously, They bite with great force, their strong hooked bills enabling them to inflict a severe wound, and they will suffer themselves to be held up by their bite before they will relax their hold. The name of *Razor-bill* is certainly a most appropriate one.

The flight of this bird is firm, well-sustained, very swift, and, considering the heavy body and short wings, very powerful. It is performed with short, quick, vigorous flappings. They never sail; but on one occasion I saw an individual endeavor to flap its wings with a slow, measured stroke. It was but a few yards, however, and it at once found that mode of flight impracticable. On the water they swim lightly and elegantly with the head and tail elevated, exactly as represented in the right hand figure of Audubon's life-like plate. When well stewed, their flesh is by no means poor, being, though rather tough, well flavored, and not possessing the slightest rank or fishy taste. We all ate them whenever they could be procured.

The situations chosen by the Auks for their breeding places are generally the rocky, precipitous islands where there are many caverns and fissures, in which the eggs are deposited, often together with those of the Black Guillemot, *Uria grylle*. I have never found more than a single egg, though in the face of such authority as Audubon to the contrary, I should not like to assert that two are never laid. I have great pleasure in being able to corroborate the statement made by this distinguished ornithologist with regard to the sagacity displayed by the birds in protecting their eggs from the wet. When deposited in damp fissures, through which the water is continually percolating, a layer of small pebbles is placed beneath the egg, to keep it from the moisture, but in sufficiently dry situations, where the caution is no longer necessary, the birds never undertake the additional labor.

[Aug.

The eggs, though differing considerably in their markings, are comparatively uniform in size and shape, being usually about three inches in length by a very little less than two in breadth. The ground color is either pure white or with a creamy or light bluish tinge. The spots are of different shades of umber brown, very often attracted into a ring around the larger end, but sometimes pretty uniformly distributed. They vary in size from mere points to large blotches. The eggs, though thus differing among themselves, still always preserve a certain character distinct from that of the Murre, through all the endless variations of the latter. They are smaller, their shape is less elongated, they are never of a green ground color, and are never fantastically streaked and lined—the more usual pattern among those of the Murre.

I was not a little surprised, when I visited the Puffin Islands, to find there the Auks also, breeding in considerable numbers. I estimated that a fourth or fifth part of the many thousand birds breeding there were of this species. On the north side the island is rocky and precipitous, and there the birds principally collected; yet on all other sides they were mixing indiscriminately with the Puffins, and laying their single egg in the deserted holes of the latter. In these holes, where the earth was comparatively dry and warm, not a vestige of a nest of any kind was found, the egg being deposited on the bare ground. Associated so intimately, I never saw the slightest semblance of any difficulty between the two species, although in some instances they were incubating in contiguous holes. At that date (July 25th) some of the eggs were quite fresh, and I found young birds, from which is to be inferred that the species is not very exact as to the time of laying its eggs.

I noticed another fact that I do not recollect of having seen recorded; it is, that the Auks associate in considerable numbers with the Murres. While passing the well-known rocks where the latter were breeding in tens of thousands, among the countless flocks flying constantly around us, we never failed to detect some of the Auks, either in flocks by themselves or mixing indiscriminately with the Murres. Although the two birds are identical in size and colors, they could always be distinguished, even at the distance of a long gun shot, by their bills; the long, slender and pointed ones of the Murres contrasting distinctly with the short, thick, seemingly truncate bills of the Auks. As a natural consequence of this intermingling, the eggs must of necessity be confounded; yet I do not think it would be difficult to distinguish with tolerable certainty the two kinds, by the differences already pointed out.

It would seem the Razor-billed Auk is capable of conforming its habits in a remarkable degree to suit varying circumstances, while carrying out the great law of reproduction. Its eggs are deposited in fissures and caverns with the Black Guillemot, on the bare rock with the Murre, and in holes in the ground with the Puffin. The time of depositing its eggs, and their number, (?) also vary. The fact of its associating in perfect harmony with other species to the extent which it does, indicates the possession of a remarkably peaceful disposition. It is known universally to all fishermen and eggers, as well as to the natives, by the singular name of "*Tinker*." Its proper name I never heard applied to it.

MORMON ARCTICUS ?* Illiger.—Arctic Puffin. "Parrakeet."

Mormon arcticus, Aud., Birds Amer. vii. 238, pl. 464. Cassin, Gen. Rep. 903.

The habit of collecting in immense numbers at particular localities during

* A series of Puffins recently received from Europe by the Smithsonian Institution, has raised a doubt with regard to the specific identity of the American bird with the true *M. arcticus* of Europe. I have therefore thought it proper to give the name *arcticus* with a query. It is also believed that there is on the Labrador coast an undescribed species of *Mormon*, in addition to the present. Prof. Baird is at present investigating the subject, the results of which will soon be published in a monograph.

the breeding season, so characteristic of the whole family of *Alcidæ*, is a trait exhibited in the highest degree by the species now under consideration. With scarcely the exception of the Common Murre, no bird of the family shows so pre-eminently gregarious a disposition as does the Arctic Puffin. Collecting, as it does in thousands, on particular islands of small extent, it becomes a matter of astonishment that food can be procured in sufficient quantity to sustain them, or that each pair can find a place to deposit its egg. The pertinacity, too, with which they cling to the immediate vicinity of their breeding place is remarkable. But a very short distance from an island where there are thousands, it is a comparatively uncommon thing to see a Puffin. The most extensive of these breeding places appears to be an island near the harbor of Bras-D'or, visited by Audubon in 1833, of which he has written so graphic and instructive an account. The one, however, that I had an opportunity of visiting cannot be much behind it in point of the numbers of the birds breeding on it; and during a stay of three days I had ample opportunity of examining the island and noting the manners of its curious population. My visit was on the 25th, 26th and 27th of July. Let a short extract from my journal describe our approach to the island.

"We were now within less than a mile from the island, towards which all eyes were anxiously turned, and still not a bird met our gaze. But a few minutes more, however, and they commenced to appear, flying round the boat or resting on the water; all were 'Parrakeets' and 'Tinkers,' except now and then a solitary 'Turre.' They were tamer than I ever saw birds before, almost flying between the masts of our little whale-boat; it was hard to restrain from firing. As we rounded the island close to the shore, they came tumbling out of their holes by hundreds, and with the thousands we disturbed from the surface of the water, soon made a perfect cloud above and around us, no longer flying in flocks, but forming one dense continuous mass. And yet not a gun had been fired."

The Parrakeet Islands are three in number, lying along the western shore of Esquimaux Bay, just at its mouth. The one I visited is the innermost as well as the largest, though the others are equally crammed with the birds. It is about a mile in circumference; in shape almost a perfect semicircle, with two points stretching out and enclosing a snug cove, where only can a landing be effected with safety. It is abrupt and precipitous on the three sides, the fourth sloping gradually down to the cove. The top is nearly flat, and covered with a rather luxuriant growth of grass, the soil being enriched by the innumerable droppings of the birds. The three sides in which the holes are dug are so steep and precipitous that it required considerable agility to scramble along them, the danger of falling into the water below being increased by the slipperiness of the soil, worn smooth by innumerable feet, and continually moistened with ordure. The sides are composed of soft loamy earth, with rocks of every size and shape jutting out in all directions, and afford the most favorable possible conditions for the excavation of the burrows. The fourth side between the two points is composed mostly of masses of rock, in the crevices of which the Auks chiefly deposit their eggs, though they very often appropriate the deserted holes of the Puffins.

The holes in the ground in which the Puffins deposit their eggs,—a habit, as far as I am aware, entirely peculiar to the genus in this family of birds—are excavated by the birds themselves, an operation for which their powerful beaks and long strong and sharp claws admirably adapt them. They extend nearly or quite in a horizontal direction, and are subcircular in shape, with the diameter scarcely larger than is necessary for the free passage of a single bird. They vary much in length, but the majority are not so deep but that the egg may be reached by thrusting in the arm to its fullest extent. Their course is seldom in a straight direction; they curve and wind in a most tortuous manner, many burrows being connected together by winding passages. The en-

trances to the holes are worn flat and smooth by continual paddling from the feet of the birds, and, as well as the whole sides of the island, are moist and slippery with the ordure. The sides of the island from just above high water mark to the very top, are perforated with innumerable holes, but on the top itself not a single burrow is to be seen. At the further extremity of the hole, which is usually a little enlarged, the single egg is deposited, always a slight bed of dried grasses being first arranged to keep it from the moist earth. I have indeed found eggs lying on the bare ground near the entrance of the burrows, whither they had apparently been dragged by the bird as it hurriedly made its exit; but in no instance did I find one in its usual position at the further extremity, that was not upon a layer of grass. I noticed this fact the more particularly, since Audubon expressly states that no nest whatever is formed for the reception of the egg. Without for a moment doubting the accuracy of that great naturalist's observations, the present case is only additional proof of the extent to which the habits of birds are influenced by circumstances; the position of nests, the number of eggs, &c., varying much, and the food changing in a measure with every change of locality. The eggs measure two and a half inches in length, by one and three-fourths in greatest diameter, varying very little from this standard; in shape, which is a rather rounded ovate, they differ in being more or less obtuse at the smaller end. The greatest diameter is nearly opposite the middle. The shell is usually more or less granulated, but differs much in the extent of the granulation. The color is white or whitish, varying from nearly pure to a brownish hue, the latter color being in the shell, and not caused by soiling or discoloration. They are marked with obsolete, sometimes almost imperceptible dots, spots, and lines of light purplish, mostly attracted into a ring around the large end. There are sometimes a few irregular splashes of very light yellowish brown. Audubon is clearly in error when he states that they are simply "pure white." At that date, (July 25th) they all with few exceptions contained young about to be hatched.

Another extract from my journal will portray, perhaps more graphically than could be done in any other style, the manners of the birds on being invaded. "Hardly had our boat touched the shore than we leaped out, guns in hand, and at once scattered over the island. As we advanced along the sides, the affrighted birds darted past us like arrows, issuing from their burrows beneath our feet and around us, and all making directly for the water. Those already disturbed flew in every direction above us, while thousands rested on the water in a dense mass at a little distance. I took my stand on a flat rock, and in less than an hour a pile of Puffins, more than I could carry, lay at my feet. Shortly after I commenced firing the birds formed themselves into an immense circle, of a diameter of perhaps a third of a mile, one point of which just grazed the island. It was astonishing to see with what precision this circle was preserved, each bird flying directly in the wake of the one that preceded. I had merely to stand facing the advancing birds, and no better opportunity for continual slaughter could be desired. I now realized what I had been told, but had found hard to believe, that a wagon might be filled with the birds by a tolerably expert marksman, shooting them at just such a moment that they should fall into it. The poor things seemed not at all aware of the nature of the danger that threatened them; flying so close past me that I could almost strike them with my gun. During the continual firing the birds would emerge from their holes every minute or two; and after shooting for half an hour on one spot I was not a little surprised to see two or three start out almost from between my feet, and in great fright make the best of their way down to the water. On emerging from the holes the birds generally looked around for a moment to see what was the matter, and then in great haste fluttered and tumbled down to the water below, in which they immediately dived, and swimming swiftly under water reappeared at some distance. From the countless thousands flying

around me I did not hear the slightest note of any kind; they flew in perfect silence. When wounded, if they fell on the land, they immediately ran and threw themselves into the nearest hole, if in the water, they dived and swam as far under the surface as their strength allowed. I observed not the slightest indication of any sympathy for those wounded or killed on the part of the other birds, as stated by Audubon. The survivors did not notice them in the least, though they lay exposed everywhere on the rocks, and floated about on the water."

The flight of the Puffin when once on wing is firm, well sustained, very swift and performed with short, quick, vigorous beats. When it takes flight from a rock whence it can project itself into the air, it at once supports itself without difficulty; but when on the water it is obliged to flap over the surface for several yards before it can rise on wing. When getting under weigh, the feet are extended backwards and outwards on each side of the tail, which is spread, but they are soon drawn up, and the tail closed. When shot at and not touched, like the Auks they swerve from their course, open and shut the tail, and extend the feet. When standing on a rock or at the entrance of their burrows, where they alight without the slightest difficulty, they present a peculiarly grotesque appearance, such as is afforded by no other bird. Their short thickset bodies, big heads, enormous brightly colored bills and red legs, give them a comical appearance, which is enhanced by their upright position and the odd nature of their movements, as they twist the head and jerk the body in various directions. Though on a three days acquaintance we were somewhat familiarized with their movements, we could never quite restrain a laugh when we saw one thus "attitudinizing" on the edge of a rock.

When taken in hand the Puffin utters a loud, hoarse, croaking scream, at the same time fighting most furiously. They are capable of inflicting a very severe wound with their powerful bills, easily drawing the blood. Their long and strong inner claw is also an effective weapon, so that by dint of scratching, biting, and struggling, they proved difficult customers to manage. The most courageous of our party seldom held one more than a few moments before he was glad to set it at liberty. Indeed, their rage at being caught is so ungovernable, that two held together attacked each other with fury, and a single one held up by the wings, bit its own wing and scratched its own face most energetically.

I could not but admire the beautiful provision of nature with regard to furnishing this bird with the means of excavating its burrow with facility. The inner claw of each foot is very long, much curved and excessively sharp. To preserve it so, when not in use, it always lies perfectly flat, so that the point does not rest on the ground. In digging and fighting, however, it is held upright, and then becomes a very effective weapon. The bill, always so remarkble in form and color, varies much with age in size and shape, and also in the extent of the ridges and furrows. The color, however, is always pretty constant; and a description of its tints, with those of the eyes, feet, &c., taken from a very perfect fresh bird, may not be uninteresting, as the color fades much in dried specimens. Base of the bill and first ridge dull yellowish white, between the two dark bluish ash; rest of bill bright vermillion red, the tip of the lower mandible and the two last furrows being yellowish white. Inside of mouth and warty rugose excrescences at the base of the commissure bright chrome. Iris hazel, eyelids vermillion, the short processes above and below the eye bluish ash. Legs and feet bright orange red, claws black.

I was much surprised while at Rigolet, to see a great number of Puffins flying over the surface of the Bay in large compact flocks. Whether they had come from the island described, or whether there was another island in the immediate vicinity, I am unable to say, though I think the latter most probably the case. These birds proved rather shy, avoiding our boats with some care. The fact of their being found so far inland is worth recording.

[Aug.

The flesh of the Puffin, though not ill-flavored, is so excessively tough as to be eatable only in cases of necessity. It is most commonly known as the "Parrakeet," (Paroquet) as it is pronounced; they are also called "Sea-parrots," and are sometimes designated by their proper name of Puffin.

URIA (URIA) GRYLLE Latham.—Black Guillemot.—"Sea-pigeon."

Uria grylle, Aud., Birds Amer. vii. 272, pl. 474.
Uria (Uria) grylle, Cassin, Gen. Rep. 911.

The history of the Black Guillemot is an interesting one. In the extraordinary changes of plumage it undergoes, in its extensive breeding range, and the many entirely peculiar habits it possesses, it differs widely from all birds of the family on the eastern coast of America. The most remarkable fact connected with it is, that it breeds abundantly in the interior of the continent, being fouud in great numbers on the southern shores of Hudson's Bay, while the other species of *Alcidæ* are probably without an exception exclusively marine. It is very plentiful throughout the extent of Labrador, where many remain during the whole winter; in fact, with the exception of the Auks, Murres, and Puffins, which congregate in such immense numbers at certain places, it is the most common and generally distributed bird, breeding along the whole coast. I obtained eggs at Sloop Harbor, the first locality visited, and at Groswater Bay they were still more abundant. Audubon speaks of finding them at the Magdaline Islands, and I have seen specimens from Greenland, which, with the fact of its breeding plentifully on Hudson's Bay, prove for it a breeding range remarkable among the *Alcidæ*. It is a hardy bird, remaining throughout the year in Labrador. The changes of plumage which it undergoes are very great. About the middle of August, or as soon as the duties of rearing the young are concluded, the change commences, with the moult. In a very short time they have become most curiously mottled with pure white, and the change goes on till the body becomes almost entirely white—the wings and tail mostly remaining black. In this state of plumage, which is shared also by the young for the first year, they continue during the winter, and until the breeding dress is again assumed the following spring. While undergoing the change, they are entirely unable to fly, from the loss of the primary quills.

The Black Guillemot chooses for its breeding place the most rocky, broken, and precipitous islands along the coast, in the numerous fissures and caverns of the eggs are deposited. Wherever there are rough jagged rocks sloping down in huge masses to the water, there the Black Guillemot will always be found breeding in greater or less abundance. Though they never congregate at one spot in such immense numbers as the Puffins and Murres are wont to do, yet there are some islands which, from their peculiar adaptation to their wants, are taken complete possession of by the birds. These islands, wherever found, are known to the natives as "Sea-pigeon Islands." Here they breed in great numbers, every fissure and cavern being occupied by one or more pair. They show marked preference for the most tortuous and deepest crevices, at the extremity of which the eggs are deposited. They are most usually two in number; never more, so far as my own observations extend; but as Audubon, on the best of authority, personal observation, expressly states that the number is sometimes three, the fact must be considered as established. They measure nearly or quite two inches and three-eighths in length by one and five-eighths in greatest diameter, and are, in size and shape—which latter is nearly elliptical—pretty constant, much more so than is usual in the family. The shell is rough; its ground color a very light greenish or earthy white; it is irregularly spotted and blotched with two shades of brown, one very dark, and with light purplish. The markings are mostly attracted into a ring about the larger end, though they vary much in their disposition, sometimes being very regularly distributed over the whole surface. The egg is never, I

believe, streaked in any manner. Towards the latter part of June or 1st of July the eggs are laid, and the young appear the second or third week of that month; but the precise period of incubation I am unable to state. When surprised on the nest, the parent, if she be not already there, creeps to the furthermost extremity of the fissure, and, as if aware of the safety of her retreat, cannot be induced to come out. But if it becomes aware of an approach before the entrance be obstructed, it invariably takes flight, making directly for the water. Should the fissure be so shallow that the bird may be reached by the hand, it sits quite still, even allowing a noose to be put over its head without struggling, and on being taken in hand shows a gentleness of disposition quite the opposite of the Puffins. It merely pecks at the hand once or twice feebly, and yields itself in silence and without struggling. The young at first are entirely of a dull sooty black, and have not the beautiful vermillion legs of the adult, these being of a dusky hue. They constantly utter a low, plaintive "peep," when requiring attention from the parent. On a warm, sunny day, all the birds will sometimes leave their eggs and young, and collect in large flocks on the water at a little distance from the shore, where they wash and plume themselves. So completely are the nests deserted on these occasions, that on an island nearly a mile in circumference, I have found but a single bird on its nest, though hundreds rested on the water at a little distance.

The flight of the Black Guillemot is firm, even, and direct, though not powerful; performed by quick flappings, when the white of the upper and under surfaces of the wings shows as one continuous spot. They invariably, except when going to and from their eggs, fly very low over the water; I never saw one more than a few feet over the surface, and they usually just clear the tops of the waves. They are rather timid and wary, seldom allowing an open approach within shooting distance, and always when flying, wheeling and changing their direction just at the right moment. The best way to procure them is to sail or row directly down wind upon them, since, being unable to rise from the water except against the wind, they are forced to fly in such a direction as to afford a good shot. They often dive on being approached, when by noting their direction and pursuing in haste, they may be shot the instant they rise, or as they fly off. They are most expert divers, easily eluding, when on the watch, the shot intended for their destruction. When shot at in flight and not touched, they generally plunge at once into the water, as if killed, which idea however is quickly dispelled by seeing them reappear at a little distance and take flight. Except near large breeding places they are seldom seen in companies of more than a dozen, and far oftener they are to be found singly, or two or three together. They are universally known to the natives and fishermen as "Sea-pigeons," the only name I ever heard applied to them.

Uria (Cataractes) lomvia, Brünn.—Foolish Guillemot. Murre. "Turre."

Uria (*Cataractes*) *lomvia*, Cassin, Gen. Rep. 913.

On the sixth of July we passed a celebrated breeding place of these birds, known as the "Murre Rocks," situated a few miles north of the harbor of Little Mecattina. They are two small, rocky and very precipitous islands, almost entirely destitute of vegetation; the sides, which rise abruptly from the sea, are composed of successive tiers or ledges of shelving rock, on which the eggs are deposited. The birds at this date were breeding on the islands by tens of thousands; their number was truly incredible, and yet I was informed that these were rather fewer than usual. As we drew near the island, the air seemed darkened with the masses that wheeled and circled overhead; while on every flat rock and ledge the birds were densely packed in rows and tiers, each sitting, or rather standing (for they seemed to rest perfectly upright on their rumps) sentinel over its solitary egg. The birds all seemed to be facing in the same direction, and it was with great pleasure that I noticed the curious

effect mentioned by Audubon in his interesting account. The white breasts of the birds appeared in marked contrast to the dull grey of the rocks, with which the color of the head and neck so well harmonized as to cause the birds to appear deprived of those very indispensable portions. To my great disappointment, I was not permitted to land and examine the islands and their inhabitants; our captain, as on other occasions, paying no regard to the wishes of the passengers. Again, on our return, though we passed between the islands, not for an hour, even, would he delay, to enable me to notice the birds or to obtain specimens. I am therefore unable to give any account of the manners of these most interesting birds. A barrel of eggs was procured, and placed at my disposal.

The egg of the Foolish Guillemot is notorious among that of all other birds, for the variations it presents in size, shape, color and markings, but more especially the latter. From a large number of specimens, I found the average size to be a very little over three inches and one-fourth in length, by two in greatest diameter, while the greatest difference in length was five-eighths of an inch. The diameter was much more constant, differing but one-fourth, thus causing the variations in shape to be exceedingly great. The ground color of the egg varies from a bright cream color to pure white, and then passing through earthy, greyish, bluish and greenish-white to light green, is found of every shade of the green to the very darkest. The more usual color is some shade of green. The markings of the cream colored and white specimens are usually spots and blotches of different shades of brown, pretty uniformly disposed over the whole surface. Eggs of this type bear the closest resemblance to those of *Utamania torda*, but may usually be easily distinguished by their larger size and more pyriform shape. The prevailing pattern of coloration among the light earthy and bluish-white eggs is a ring of spots around the larger end; these very closely resemble those of *Uria grylle*, as far as color is concerned. The green eggs present an infinite variety of patterns, which it would be useless to attempt to define; they are oftener streaked than blotched, the lines being angular and sharply defined, crossed and recrossed in the most fantastic manner. Occasionally a pure white egg is met with, and I have seen some that had much the peculiar pattern and appearance of those of *Meleagris gallipavo*.

The "egging," or traffic in the eggs of the Murre as at present carried on, is on systematic principles, and furnishes constant employment during the summer to men who make it their profession. The method pursued to procure the eggs fresh is singularly unique, but entirely successful. They land on one of the islands and break every egg that they can find upon it; the next day, repairing to the spot, all those eggs found cannot but be fresh. By collecting these, of course the birds are prevented from sitting, and thus any quantity of eggs may be procured. Notwithstanding the wholesale system of destruction thus carried on against the birds, they are still to be found in prodigious multitudes; yet it is remarked by all those who have visited the coast for a number of years, that their numbers are slowly but surely decreasing under this incessant persecution, which not even their myriads enable them to withstand. I was informed that there is a law which forbids the collecting of the eggs, but if so, it has very little practical effect.

The present species, as well as the *U. ringvia* and *U. arra*, is known to the natives and fishermen as either the "Murre" or "Turre," the latter being perhaps the more usual appellation. This name is also applied to the *Mergulus alle*, which is known as the "Little Turre," or sometimes as the "Little Noddie." On the coast of Maine it is also called "Ice-bird."

A letter was read from Dr. Jas. C. Fisher, resigning his office as Librarian of the Academy, on account of absence from the city in military service for the suppression of rebellion.

On motion the resignation was accepted.

cous; a large black discal spot on each wing: two or three obsolete spots near anal angle, the second from the angle with a faint yellow lunule; fringe brownish white.

Under side greyish white, bluish next base; primaries have a fuscous spot near base, a discal bar and a transverse sinuous row of elongated fuscous spots, each edged with whitish; along the margin obsolete spots surmounted by faint lunules.

Secondaries have three fuscous points near base; a discal bar and a transverse sinuous row of fuscous spots; whole hind margin bordered by small metallic blue spots, each surmounted by a blackish lunule.

Female. Upper side clear brown; the obsolete spots next anal angle surmounted by a narrow crenated yellow band; under side as in male, but the five spots next anal angle are surmounted by ochrey yellow lunules edged above with black; fringe long and fuscous at the extremities of the nervures.

California, from Dr. H. Behr.

Lycæna Scudderii, Edw.

Female. The more common form differs somewhat from that heretofore described, which appears to have been a variety, in that the base of both wings is violet blue, and the black marginal spots of secondaries distinct, the two or three next anal angle surmounted with fulvous; under side as in the male.

This species is found abundantly near London, Canada West, as I am informed by Mr. W. Saunders. I have also received it from Fort Simpson.

Parnassius Smintheus, Doubleday: figured in Genera of Diurnal Lepidoptera, but not described.

Expands 2¼ inches. Size and form of *Clarius*.

Male. Both wings pure white, semi-transparent at apex of primaries; hind margin of primaries sprinkled with black scales which take the form of indistinct lunules; a second similar series anterior to these; a black bar on the arc, and, within the cell, a transverse, elongated black spot that terminates a little short of the median nervure; on the costa beyond the cell, a crimson spot in a black ring, and below this a black spot with crimson centre; a small black spot within the inner margin; base of wing and edge of costa thickly sprinkled with black scales; fringe white, cut with black at the ends of the nervures.

Secondaries black at the base and along the abdominal margin, from which black scales extend to the cell and around the arc; a submarginal row of obsolete black spots; a small crimson spot on costal margin and a larger and brighter one in the disc, both in black rings.

Under side with all the markings of the upper, but less vivid in color; secondaries have an additional small crimson spot within the abdominal margin near the anal angle, and at the base four crimson spots in a curved band, each more or less edged with black: the spot in the disc with white centre.

Female. A little larger than the male; the whole hind margin of primaries semi-transparent, enclosing a transverse row of white lunules, but without other spots; the red spots larger and paler, the one on disc of secondaries with white centre; on the under side of secondaries the costal spot also has a white centre, and near the anal angle are two red spots.

California.

Limenitis eulalia, Doubleday: figured in Genera of Diurnal Lepidoptera, but not described.

Expands 2¾ inches.

Male. Upper side of both wings olive brown, with a blackish tinge upon the outer limb; hind margin bordered by a broad crenated band of lighter color, through which runs a black line; a large golden yellow apical spot fills the space between the marginal band and narrow costal border of primaries; across

D. G. Elliott Esq.
with the aspects of the Author

the middle of the wings a common white band, commencing on the costa of primaries, with a large spot cut into three by the nervures, followed by a second, oval, separated from the first by a wide space, and out of the line in the direction of the inner angle; after this the band is uninterrupted except by the nervures, and diminishes to a point a little within the abdominal margin, on the arc of primaries a narrow, transverse, ferruginous band, and another in the cell, each edged on either side by a black wavy line; a similar line mid-way between these bands; the cell and costa next base have a dull green tinge; at anal angle a black spot within a fulvous lunule; fringe brown, white in the emarginations.

Under side pale brown, with a bronze lustre on secondaries; primaries have a broad hind margin, crenated next the inner angle, with a faint, pale blue line running through it and edged anteriorly by a narrow, pale blue band; the yellow spot as above, but paler; below this and between the marginal and white bands, smoky black; the white band as above but a little enlarged; the bars in the cell larger and fulvous; inner margin next base greyish; hind margin of secondaries narrower than that of primaries, wholly crenated, with a pale blue line running through it and bordered anteriorly by a broad, pale blue band; the white band is edged without, and near its point suffused with light purple; inside the band to the base, are alternate, irregular, transverse bands of purple and lustrous yellow brown; abdominal margin pale blue; the nervures much bordered by purple or blue scales; body above olive brown; beneath, bluish white; antennæ and club dark brown.

Female scarcely differs from the male.

California, from Dr. H. Behr.

Synopsis of the North American Forms of the COLYMBIDÆ and PODICIPIDÆ.

BY ELLIOTT COUES.*

Family COLYMBIDÆ.

Char. Feathers of forehead reaching to the nostrils. Nostrils narrow and linear; their upper edge with a dependent lobe. Lores densely feathered. Tertials short and stiff. Tail fully developed. Tarsus and toes covered with small, regular, polygonal, reticulated plates. Tibiæ feathered on the joint. Toes fully webbed. Claws strong, narrow, oblong, very convex superiorly. Posterior edge of tarsus smooth, formed by a single row of very convex overlapping scales. Lobe of hind toe moderate. Size large; general form stout and strong; body robust; neck short and thick, without crests or ruffs; the back spotted.

Genus Colymbus Linnæus.

Colymbus, Linn. 1735, et auct. nec Ill. 1811; nec Pallas, 1811; nec Briss. 1764.
?*Cepphus*, Mœhring, 1752, secundum G. R. Gray.
Cepphus, Pallas, 1811, partim.
Mergus, Brisson, 1764, fide G. R. Gray; nec auct.

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* The great accession of new material in the Museum of the Smithsonian Institution has furnished the means of making some additions and corrections to the last account of the Loons and Grebes of North America—that by Mr. Lawrence in the General Report. The writer having lately been occupied, in connection with Dr. Geo. Suckley, U. S. A., in the preparation of a Government Report, took the opportunity to institute a thorough revision of the two families. The results of that investigation will be found in full in the Report alluded to; but as it may be some time before its publication, it has been thought advisable to issue in advance this brief synopsis. Particular attention has been paid to the characters of the families and subfamilies, and to the arrangement of the species under their appropriate genera.

[April,

Urinator, Cuvier, 1799–1800, fide G. R. Gray.
Eudytes, Illiger, 1811; (*Eudites*, Kaup, 1829.)

1. COLYMBUS TORQUATUS Brünnich.
C. torquatus, Brünn. 1764; *C. glacialis*, Linn. 1766, auctor. pleriq; ad.—*C. immer*, Brünn. 1764; Linn. 1766; Gmel. 1788; Lath. 1790; juv.—*Cepphus torquatus*, Pall. 1811, ad.; *C. imber*, Pall. 1811, juv.; *Eudytes glacialis*, Illiger, 1811; *Eudites glac.* Kaup. 1829.

2. COLYMBUS ADAMSII G. R. Gray.
Colymbus Adamsii, Gray, Proc. Zool. Soc. Lond. 1859, 167.

Sp. Ch. Form and general appearance that of *C. torquatus*, but larger, with the bill disproportionately larger, and differently shaped.

Bill very large and strong, about equal in length to the head, longer than the tarsus, greatly compressed, the tip very acute, not decurved. Culmen very slightly, scarcely appreciably, convex. Commissure perfectly straight. Gonys straight, or very nearly so, to the angle, which is prominent, well defined; and straight, or even a little concave, to the tip. Feathers of forehead extending beyond the middle of the nostrils. Groove along the symphysis of the lower jaw extending but little beyond the angle.

Adult.—Bill light yellowish, growing dusky at the base. Head and neck all round deep steel blue, with purplish and violet reflections, and glossed on the back of the neck with deep green. Gular patch of white streaks very small, less than in *torquatus*, but the individual streaks larger, as are also those on the side of the neck. Upper parts generally as in *torquatus*, but the spots considerably larger, and on the scapulars and tertials rectangular, instead of nearly square, being much longer than broad. Otherwise like *torquatus*.

Plumage of the young unknown.

Bill above 3·70; along gape 5·25; height of nostril anteriorly 1·10; width, ·50; tarsus 3·50; outer toe 4·65 inches. "Irides light reddish-brown, legs and feet olivaceous."

Habitat. Russian America (Gray). Arctic America (Ross, Kennicott).

Table of Distinctive Characters.

C. torquatus. Bill 2·75 inches, not longer than the tarsus; moderately compressed; black; the tip only sometimes yellowish. Culmen very convex. Commissure decurved. Gonys regularly convex throughout its whole length, the angle scarcely appreciable; the groove along symphysis extending nearly to tip. Feathers of the forehead falling short of the middle of the nostrils. Head and neck mostly deep glossy green. White spots of back moderate, scarcely longer than broad.

C. Adamsii. Bill 3·75; longer than the tarsus; exceedingly compressed; light yellow, except at base. Culmen very slightly convex. Commissure straight. Gonys straight, or nearly so, to the angle, straight, or even a little concave to the tip, the angle prominent, well defined. Groove along symphysis very short. Feathers of forehead extending beyond the middle of the nostrils. Head and neck mostly deep steel blue. White spots of back large, much longer than broad.

There cannot be, I think, the slightest doubt of the specific distinction of the present species and the *C. torquatus*. The difference in the size, shape, and color of the bill alone would separate the two, were there no other characters involved. It is every way a much larger bird. The species is, so far as we are aware, now for the first time presented in an American work. The original description, by Gray (as above), is very brief, but the distinctive characters of the species are so concisely stated that we have no difficulty in identifying the large series before us with the description. The Loon mentioned by Audubon, as having "the point of the bill recurved, and of a fine yellow tint," was very possibly an individual of this species. The type of

the species is from Russian America. The large series which the Smithsonian possesses, were collected in the vicinity of Great Slave Lake and McKenzie's River, by R. Kennicott and B. R. Ross, Esqrs. It has not been obtained from the Atlantic coast.

3. Colymbus arcticus Linnæus.

C. arcticus, Linn. 1735, et auct. *Cepphus arct.* Pall. 1811. *Eudytes arct.* Illig. 1811.

4. Colymbus pacificus Lawrence.

C. pacificus, Lawr. Gen. Rep. Birds, 1858, 889.

Sp. Ch. Generally similar to *C. arcticus*, but every way smaller; the wing from an inch to two inches shorter, the legs and feet proportionately shorter, and the bill smaller, shorter, weaker, usually with a less decurved culmen, and more acute tip. Colors precisely as in *C. arcticus*. "Length 25 inches; wing 11¼; bill 2·12; tarsus 2·75."

Habitat. Northern North America. Pacific coast.

The types of Mr. Lawrence's *C. pacificus* are young birds, and their relationship can only be determined by their size and form. A comparison of these types with an extensive series of skins of the adult bird, from the interior of Northern North America, has shown them to be beyond a doubt identical. The entire series differs from a fine adult European bird furnished for examination by the Copenhagen Museum, in those points which are given in the diagnosis. The difference is very marked indeed, and while all the birds in the North American series agree perfectly with each other, there is, at the same time, not the slightest graduation between them and the European bird. This would seem to indicate that the North American bird is distinct from the European; or, in other words, that "*Colymbus pacificus* Lawr." is the "*Colymbus arcticus ex America.*" Upon this supposition it would be necessary to exclude the *C. arcticus* from our avi-fauna. There is in the collection, however, a specimen (from Puget Sound) which is fully as large as the European bird, with which it agrees in the minutest particulars, and is much larger and stouter every way than the rest of the series. I have, therefore, at present no other alternative than to admit the *C. pacificus* as distinct from the *arcticus*, in view of the differences constantly observable, and at the same time to retain the latter as an inhabitant of North America. I think it probable, however, that if the true *arcticus* is really found in North America, it is rather as an infrequent visiter than as a permanent resident. I do not regard the question as yet definitely settled, especially as the single European skin examined may have been an unusually large specimen. Further investigation will be necessary to definitely settle the point.

Should the *pacificus* prove to be really distinct from the *arcticus*, it would be another example of a peculiar law which prevails extensively throughout the *Colymbidæ* and *Podicipidæ*. This is, that nearly all the species have, so to speak, their analogues, agreeing in colors and general appearance, but differing in size, and in the size, shape, and stoutness of the bill. Instances are seen in the cases of *Colymbus Adamsii* and *torquatus; Podiceps grisiegena* and *Holbölli; P. cornutus* and *?arcticus; Aichmophorus occidentalis* and *Clarkii; Podilymbus podiceps* and *brevirostris*, etc. This law seems capable of very extensive application.

5. Colymbus septentrionalis Linnæus.

Colymbus septentrionalis, Linn. 1766, et auct. *C. lumme*, Brünn. 1764, ad. *C. stellatus*, Brünn. 1764; Gmel. 1788; Lath. 1790; juv. *C. striatus*, Gmel. 1788; Lath. 1790; juv. *C. borealis*, Brünn. 1764; Gmel. 1788; Lath. 1790. *Cepphus septentrionalis*, Pall. 1811. *Cepphus stellatus*, Pall. 1811.

[April,

Family PODICIPIDÆ.

Char. Feathers of forehead not reaching to the nostrils. Nostrils linear, oblong, sometimes quite broadly oval, without dependent lobe. Lores naked. Tertials long, reaching to the tip of the primaries in the closed wings. Tail rudimentary. Tarsus and toes covered with regular, long, narrow, transverse scutellæ. Toes lobed, connected at base by a membrane. Tibiæ feathered to the joint. Claws weak, broad, short, flat. Posterior edge of tarsus serrated, formed by a double row of small, pointed scales. Lobe of hind toe large. Size moderate, or very small; general form rather slender; body depressed; neck long; crests or ruffs usually present; the back never spotted.

The preceding diagnosis expresses very briefly the more prominent characters of a group of birds composing the subfamily *Podicipinæ* of modern authors. It corresponds with the *Colymbi pedibus palmatis* and *pedibus lobatis* of Gmelin, nearly with the *Cepphi* and *Colymbi* of Pallas, and with the genera *Colymbus* and *Podiceps* of Latham. Although related to the *Colymbidæ* in most points of structure and habits, they nevertheless differ in so many and so essential characters, that a single family cannot, without great latitude of definition, contain the two groups. We have, therefore, restricted the *Colymbidæ* to the *Colymbinæ* of authors, and raised the *Podicipinæ* to the rank of a distinct family.

Two subfamilies are represented in North America.

Subfamily PODICIPINÆ.

Char. Bill moderately stout, or very slender. Commissure not abruptly decurved at the end. Nostrils linear. Bare loral space narrow and linear. Feathers of the head with their shafts normal. Tarsus at least three-fourths the middle toe; generally but little, if any, shorter. Toes connected at base for a moderate distance, the lobe of the hind toe broad. Usually (always?) with more or less conspicuous crests and ruffs.

Genus I. ÆCHMOPHORUS Coues. N. G.

Gen. Char. Bill very long, exceeding the head, straight or very slightly recurved, slender, attenuated towards the tip, which is very acute. Culmen straight or slightly concave. Commissure about straight. Gonys convex throughout its whole length, the angle scarcely appreciable. Nasal groove long, shallow, and narrow. Bare loral space very narrow. Wings rather long, pointed, the outer primaries much attenuated. Legs very long. Tarsus as long as the middle toe and claw, exceeding the bill, excessively compressed. Outer lateral toe much longer than the middle. Lobes united at base for a very short distance. Size large; body slender; neck very long. Head with moderate crests, but without decided ruffs?

Type. *Podiceps occidentalis*, Lawr.

1. ÆCHMOPHORUS OCCIDENTALIS (Lawr.)

Podiceps occidentalis, Lawr. 1858.

Char. Length about 29 inches; wing 8·25; bill or tarsus 3·00. Bill equal to tarsus, straight, dark colored, except terminally and along the cutting edges. Gonys straight from base to angle, and nearly so from angle to tip. Feathers between eye and nostril grayish ash.

Habitat. Pacific coast of North America.

2. ÆCHMOPHORUS CLARKII (Lawr).

Podiceps Clarkii, Lawr. 1858.

Char. Much smaller than *A. occidentalis*. Length 22 inches; wing 7; bill 2·25; tarsus 2·75; bill rather shorter than tarsus, exceedingly acute, slightly recurved; the gonys regularly much curved from base to tip, the angle scarcely apparent. Feathers between eye and nostril white.

Habitat. Pacific coast of North America.

Genus II. Podiceps Latham.

Colymbus, Briss. 1760, nec. Linn. et auct. Ill. 1811; Pall. 1811.
Podiceps, Lath. 1790; (typus *Col. cristatus*, Linn.) nec Kaup. 1829.
Pedetaithya, Kaup. 1829; typus *Col. griseigena*, Budd. 1783.)
Lopharthyia, Kaup.1829; (typus *Col. cristatus*, Linn. *Podiceps*, Lath. 1790.)
Dytes, Kaup. 1829; (typus *Col. cornutus*, Gmel.)
Proctopus, Kaup. 1829; (typus *Col. auritus*.)
Otodytes, Reichenbach, 1853; (typus idem.)

Gen. Char. Bill moderately stout; usually more or less compressed; as long as, or rather shorter than, the head; not equalling the tarsus. Culmen convex, occasionally nearly or quite straight. Commissure about straight. Tarsus shorter than the middle toe and claw. Outer lateral but little, if any, longer than the middle toe. Body depressed, moderately full; head always with more or less conspicuous crests and ruffs.

Although the characters of the genus are drawn so as to exclude both the foregoing and succeeding genus, the North American species comprised in it, are sufficiently dissimilar in form to have caused the instituting of several subgenera. These may be characterized and arranged as follows:—

A. Tarsus equal to the middle toe without the claw.
  I. Bill equal to the head, four-fifths the tarsus. Bill much compressed, lateral outlines a little concave. Crests and ruffs very long and conspicuous..... *Podiceps*, Lath.
  II. Bill much shorter than the head, but little more than half the tarsus.
    1. Bill compressed, higher than broad at the nostrils; crests and ruffs, especially the latter, very long and full..... *Dytes*, Kaup.
    2. Bill depressed, broader than high at the nostrils; crests and ruffs more moderate..... *Proctopus*, Kaup.
B. Tarsus about four-fifths the middle toe and claw.
  III. Bill variable in length, always quite stout; outer lateral but little longer than the middle toe; crests and ruffs rather short..... *Pedetaithya*, Kaup.

1. Podiceps cristatus Latham.

Colymbus cristatus, Linn. 1766; Pall. 1811; Ill. 1811. *C. urinator*, Linn. 1766, juv. *Podiceps crist.* Lath. 1790, et auct.

Habitat. Europa; Amer. Sept.

2. Podiceps Cooperi Lawrence.

Sp. Char. Bill large and strong, as long as the head, very stout at the base, the tip very acute and considerably decurved. Upper mandible with the culmen very slightly concave on the basal half, the terminal portion regularly convex. Commissure irregularly sinuate to the nostrils, then regularly decurved, the radius of curvature decreasing towards the tip. Lower mandible without a groove along the symphysis of the rami beyond the angle, the tip decurved and very acute. Lower outline concave, both anterior and posterior to the angle, which is prominent and marked; the concavity is very decided in the former. First and second primaries longest, third but little shorter. Tarsi and toes as in *P. cristatus*.

Young. Upper mandible dusky, except the tip and extreme base, which are yellowish, as is also the lower mandible, except a central dusky greenish space. No white space between eye and nostril. Slight indications of a crest, but none at all of a ruff. Crown, and median dorsal line of neck, deep blackish brown, darkest on the former. Upper parts brownish black, darkest on the scapulars and lower part of the back, all the feathers, especially an-

teriorly, edged with grayish. Primaries rather light chocolate brown, their shafts and tips black. Secondaries white, their inner vanes brown towards their extreme tips. Wing coverts wholly chocolate brown.

Dimensions. Bill above 2·40, along gape 3·10, height at nostril ·55, from angle of gonys to tip 1 inch; wing 8·80; tarsus 2·40; middle toe, 3·10.

Habitat. Shoalwater Bay, W. T.

A species admitted with some doubt, but probably distinct from the preceding. It must be obtained in full plumage before the question of its relationship can be definitely settled. We do not consider it by any means certain that it will possess the conspicuous ruffs of *P. cristatus*. In that event, it would more probably fall in some other subgenus.

3. Podiceps (Dytes) cornutus (Gmelin.)

Colymbus cornutus, Gmel., 1788; Pall., 1811; ad. *C. obscurus*, Gmel., 1788, et *C. caspicus*, Gmel., 1788; juv. *C. nigricans*, Scopoli, fide Lawr. *Podiceps cornutus*, Lath., 1790, et auct. ? *P. arcticus*, Boie.

Habitat. Europ. Amer. Sept.

4. Podiceps (Proctopus) Californicus Heermann.

Podiceps auritus ex Americâ; e. g. Aud. B. Am., 1844, vii. 322. Lawr. Gen. Rep. 1858, synon. excl. Nec *Colymbus aur.* Linn.; nec script. Europ. *P. Californicus*, Heermann, 1854; Lawr., 1858.

Char. Generally similar to *P. auritus* of Europe; all the primaries chocolate brown throughout their whole extent, with a more or less notable amount of dull reddish externally. Secondaries white, the two outer ones dusky along their centres for their whole length, and the bases and shafts of all of the same color.

Habitat. Western and Northern North America; California; Great Slave Lake.

In 1854, a *Podiceps californicus* was characterized, as above, based upon an immature or winter specimen. Examination of the type, and quite a series of additional specimens, has shown that it is merely the American form of *P. auritus*. The name would, therefore, become a synonym were it not for the fact that, in all probability, the American and European birds are specifically distinct. The differences are those given in the diagnosis. In the American Eared Grebe, all the primaries are throughout their whole extent dark chocolate brown, with a more or less notable amount of dull reddish in the adult. The two first secondaries are of the color of its primaries, and bordered with white; and the basal portions and shafts of all, for the greater part of their length, are of the same chocolate brown. In all the specimens of the European type examined, the characters of the wing are very different. The four inner primaries are wholly pure white; the next is white with a sprinkling of brown on the outer web; the next is white, its outer vane brown; and all the others have more or less white at their bases and on the inner webs. All the secondaries, except the three innermost are entirely pure white, and their shafts are white to the very base. The three innermost have a dusky spot near the end of the outer web. These differences, so far as we can discover, are constant; and if so, quite sufficient to separate the two.

Although "*californicus*" was not so characterized as to show any tangible distinctive features from the *auritus*, we prefer to adopt it, as the necessity for a new name will thereby be obviated.

5. Podiceps (Pedetaithya) Holbölli Reinhardt.

Pod. rubricollis, Audub. et al. script. Amer.; nec Lath., 1790, et auct. Europ. *P. griseigena*, Lawr., 1858, excl. synon. Nec *Colymbus griseigena*, Bodd. *P. Holbölli*, Reinhardt, 1853.

Sp. Char. Generally similar to *P. griseigena*, but larger, with the bill disproportionately longer, stouter, and differently colored. Bill about equal to

the head, shorter than the tarsus. Length about 19 inches, wing 7·60. Bill above 1·90, along gape 2·40, height at nostril ·55. Tarsus 2·10; middle toe and claw 2·65.

Habitat. North America, generally.

The present species has by most authors been considered identical with the *P. griseigena* Bodd. (*rubricollis* of Latham,) of Europe. The differences, however, as pointed out by Reinhardt, are quite tangible, and so constant as to render it very probable that they are of specific value. In the European bird the bill measures 1·50 along the culmen, 2·00 along the gape, and ·50 in height at the nostrils; the wing less than 7 inches. (See diagnosis for comparison). In color, too, the bills differ. In *P. griseigena* the extreme base of the under mandible only is yellow, the color extending a little on the cutting edge of the upper mandible at base. In *Holbölli* nearly the whole of the under mandible, and the cutting edge of the upper, are yellow.

Genus III. Sylbeocyclus Bon.

Podiceps, Kaup, 1829, nec Lath.
Sylbeocyclus, Bonaparte, 1832. (Typus *Pod. minor*, fide G. R. Gray.)
Tachybaptes, Reichenbach, 1851. (Typus idem.)

Gen. Char. Bill very short, much less than the head, scarcely more than half the tarsus; very stout, little compressed, the tip obtuse; lateral outlines about straight; culmen a little concave at the nostrils, convex throughout the rest of its length; gonys straight to the angle, and from angle to tip; the former well defined. Wings short; attenuation of primaries considerable; abrupt on the inner web. Tarsus stout for this family, much abbreviated, scarcely more than three-fourths the middle toe and claw. Outer lateral toe abou tequal to the middle. Size small; body full; neck short; without decided crests or ruffs.

1. Sylbeocyclus dominicus (Linn.)

Podiceps dominicus, Linn., 1766. *Sylbeocyclus dominicus*, —?

Sp. Char. Adult.—Without decided crests, but indications of them in the length and fulness of the feathers of the parts. Crown and occiput deep glossy steel blue. Sides of head, and neck all round dark ashy gray, deepest behind, where it is tinged with bluish. Chin variegated with ashy and white. Upper parts generally brownish black, with glossy greenish reflections. Primaries chocolate brown, the greater portions of the inner vanes of all, the whole of the four or five inner, except just at tip, together with the secondaries, pure white. Under parts silky white, thickly mottled with brownish dusky; the abdomen uniform dusky gray. Upper mandible dusky, the lower mostly yellowish.

Dimensions. Length 9·50; wing 3·60; bill above ·70; along gape 1·00; tarsus 1·25; middle toe 1·75.

Habitat. Central America; Mexico; Antillean Is.; Gulf of California (Gambel); Rio Grande (eggs in Smiths. Coll.).

[Note.—*Sylbeocyclus minor*, the type of the genus, is given by Nuttall as an inhabitant of North America; but its existence in this country is very doubtful.]

Subfamily PODILYMBINÆ.

Char. Bill exceedingly stout. Commissure abruptly decurved at the end. Nostrils broadly oval. Bare loral space broad. Feathers of the forehead with their shafts prolonged into stiff bristles. Tarsus not three-fourths the middle toe. Toes connected at base for a considerable distance; the lobe of the hind toe moderate. Without decided crests or ruffs.

Genus IV. Podilymbus Lesson.

Podilymbus, Lesson, 1831. (Typus *Colymbus podiceps*, Linn.)
Hydroka, Nuttall, 1834.
Dasyptilus, Swainson, 1837, fide G. R. Gray.

Gen. Char. Bill shorter than the head, compressed, exceedingly stout, obtuse at the end; culmen straight to the nostrils, then very convex to the decurved and acute tip of the upper mandible. Commissure slightly sinuate at the base, straight to near the tip, where it is suddenly deflected. Gonys regularly convex, the angle scarcely appreciable. Upper mandible covered with soft skin from the base to the nostrils, between which are two fossæ, the anterior shallow and oblong, the posterior triangular and deep, opening into the bare loral space; the two separated by an oblique ridge. Nostrils situated near the extremity of the anterior fossa. Outer three or four primaries abruptly attenuated near the end. Tarsus much abreviated, comparatively stout, about three fourths the middle toe and claw. Middle and outer toe nearly equal. Lobes of toes broad, connected at base for a greater distance than in other genera.

1. Podilymbus podiceps (Linn.)

Colymbus podiceps, Linn., 1766. *Podilymbus pod.* Lawr., 1858. *Podil. lineatus*, Heerm., 1854. *Colymbus ludovicianus*, Gmel., 1788. *Podiceps ludov.* Lath., 1790. *Pod. carolinensis*, Lath., 1790. *Sylbeocyclus carol.*, Bon., 1838.

Habitat. Continent of North America.

female(?) and *unusually light colored*, we have had our drawing made, on account of its having been procured in the American territory," while his description is taken "from a handsome male specimen from Arctic America."

The genus Pediocaetes therefore is composed of the two following species, with this diagnosis:

General color white and brownish yellow with irregular black-markings. Beneath pure white, the feathers on the breast and flanks with brown U-shaped markings. Throat buff.....Pediocaetes Columbianus.

General color white and black, with irregular dark brown markings. Beneath pure white, with V-shaped black marks on the breast and sides, broader and closer than those of its relative. Throat white interspersed with small black marks..... Pediocaetes phasianellus.

The species may be more fully described thus:

PEDIOCAETES COLUMBIANUS (Ord.) Elliot.

Tetrao phasianellus? Ord. Guthrie's Geog., 2 l Am. ed., 1815, p. 317.
Phasianus Columbianus, do. do.
Tetrao phasianellus, Bon. Syn., 1828, p. 127.
Do. " Am. Ornith., vol. iii. 1828, p. 37, pl. xix.
Do. Nuttall, Man. vol. i. 1832, p. 669.
Do. Audub. Ornith. Biog., vol. iv. 1838, p. 569, pl. 382.
Do. " Syn. 1839, p. 205.
Do. " Birds of Amer., vol. v. 1842, p. 110, pl. 298.
Do. Newberry, Cal. & Or. Route. Rep. P. R. R. Surv., vol. vi. iv. 1857, p. 94.
Tetrao (Centrocercus) phasianellus. Swain, Faun. Bor. Am., vol. ii. 1831, p. 361.
Do. Bonp. Comptes Rendus, xlv. 1857, p. 428.
Tetrao urophasianellus, Doug. Trans. Linn. Societ., vol. xvi. 1829, p. 136.
Pediocaetes phasianellus, Baird, vol. ix. P. R. R. R., p. 626.

Head and throat brownish yellow, the front, crown, occiput and cheeks irregularly marked with black or very dark brown; superciliary band whitish; back ferruginous brown, variously spotted with black or brownish yellow; wings brownish grey, with large spots of white on all the coverts; transverse bars on the secondaries, and the outer webs of the primaries which are dark brown, spotted with the same; the tail feathers have the inner web white, outer brownish gray, dotted with darker brown: the central feathers are elongated and same color as the back—under parts are pure white, the feathers on the breast and flanks having a brown U-shaped mark. Bill black; feet brown.

Hab.—Northern prairies from Wisconsin to Oregon and Washington territories.

PEDIOCAETES PHASIANELLUS, (Linn.) Elliott.

Tetrao phasianellus, Linn. Syst. Nat., vol. i. 10 ed., 1758, p. 160.
Do. Forst. Philos. Trans., lxii. 1772. p. 394 and 495.
Do. Gmelin Syst. Nat., vol. i. p. 747.
Do. Lath. Ind. Ornith., vol. ii. p. 635.
Tetrao urogallus, var. B., Linn. Syst. Nat., vol. i. ed. 12th, p. 273.
Tetrao phasianellus, Bon. Amer. Ornith., vol. iii. 1828, text ♂. Sharp-tailed Grouse. Pennant.
Pediocaetes Kennicotti, Suckley, Proc. A. Nat. Sc., 1861.

General color black. Top of head black, a few faint marks of rusty towards the occiput, sides of head black, the feathers tipped with white; those on the side and back of neck tipped with rusty; throat white, spotted with black. The back is also black, the feathers margined with rufous brown; the rump is lighter, caused by the feathers being tipped broadly with grayish; the elongated central feathers of the tail are (in the specimen before me) jet black, irregularly crossed with yellowish white and gray. Wings blackish brown, with large white spots on all the coverts, in addition to the rusty

margins of the feathers; primaries blackish with white marks on their outer webs. Tail sometimes grayish at the base with white tips, or pure white. Under parts pure white, with a black V-shaped mark near the centre of the feathers on the breast and flanks, gradually growing smaller and fainter, as they approach the abdomen and vent. The white feathers of the legs are hair-like and extend over the toes quite to the nails. Bill black; feet dark brown.

Habitat.—Arctic America, plentiful around Hudson's Bay, but never found within the limits of the United States.

Supplementary note to a "Synopsis of the North American Forms of the COLYMBIDÆ and PODICEPIDÆ."

BY ELLIOTT COUES.

Since the publication of my paper on the Loons and Grebes of North America, the Smithsonian Institution has received, from J. Hepburn, Esq., of San Francisco, California, what has long been a great desideratum in its collections, a specimen of *Æchmophorus Clarkii* in full plumage. The interest attaching to the elucidation of this hitherto undetermined question in American ornithology induces me to offer the following brief notice of the points in which the nuptial dress differs from the ordinary well known winter plumage. The specimen alluded to, Mr. Hepburn states, was shot in the latter part of April, and is a female.

ÆCHMOPHORUS CLARKII, Coues.—(Adult female, breeding plumage.)—The chrome yellow of the under mandible, and of the tip and cutting edges of the upper, is very bright, and in marked contrast with the quite pure black of the culmen. The bare loral space is leaden blue. The crown, occiput, and neck behind are very deep grayish black, almost pure black on the occiput, and fading gradually along the neck, into the blackish gray of the back and upper parts generally, which color is scarcely, if at all, deeper than in the average of winter specimens. The white space between the eye and bill is very broad, and remarkably pure. The throat, neck before, and whole under parts are of a beautiful silky white, the line of demarcation of the black and white on the sides of the head and neck being remarkably distinct. *There is a decided occipital crest;* the feathers of that region are about one inch in length, and have the peculiar filiform character common to the crests of birds of this family. This crest, however, on the dried skin lies quite smoothly, and is not very conspicuous except on raising the feathers. *There are no decided colored ruffs;* but the white feathers of the sides of the head posteriorly, and across the throat, are longer and fuller than elsewhere, particularly the former. Although this elongation is hardly noticeable in the dried skin, it is doubtless sufficient to give to the bird when in life something of the appearance presented by most of the species of this family. In other respects the specimen before me does not differ materially from the winter series.

I have always been of opinion that the two birds which I have recently separated generically from *Podiceps* would not possess the conspicuous colored ruffs for which the type of the genus (*P. cristatus*) is so noted. The supposition to that effect, doubtfully set forth in my last paper, is now verified in the case of one of the species of the genus, and I have no doubt that the nuptial plumage of *Æchmophorus occidentalis* will be perfectly analogous to that exhibited by the species under consideration.

A specimen of *Podiceps* (*Proctopus*) *californicus*, in full summer plumage, has also been received from Mr. Hepburn. It presents the same marked differences from the European *P. auritus* as do all the other specimens from North America which have fallen under my observation; and is additional confirmation of the position assumed with regard to the specific distinction of the American and European birds. They are quite distinct species and recognizable in either adult or young plumage.

ences for the use of students who have paid less attention than myself to the subject.*

In concluding, I desire to express my thanks to several members of the Academy of Natural Sciences who have assisted and encouraged me, and especially to Dr. Jos. Leidy.

A Review of the TERNS of North America.

BY ELLIOTT COUES.

Considerable difference has prevailed among ornithological writers with regard to the relationships of many of the North American *Sterninæ* with the representative species of Europe. Having at command a very extensive series of specimens from both continents, I have instituted a careful comparison of the more or less intimately related species, believing that the results of such an investigation would not prove unacceptable to ornithologists. While this has been the principal aim of the present paper, I have endeavored to present fairly the data tending to determine some other points of synonymy and relationship which even at this late day remain open to discussion; and to give such stages of plumage as are not already too well known to require notice. The paper is not to be considered in any sense as a monograph; I have endeavored to express its character in its title.

I am under particular obligations to Mr. G. N. Lawrence and Mr. D. G. Elliot, for the opportunity of examining several unique and typical specimens, and unusual stages of plumage, of which the museum of the Smithsonian Institution does not contain examples.

Family *LARIDÆ*.

Subfamily STERNINÆ.

Section *STERNEÆ*.

Genus GELOCHELIDON Brehm.

Gelochelidon, Brehm, Vög. Deutsch. 1830. Type *S. anglica*, Mont.
Laropis, Wagler, Isis, 1832, p. 1225. Same type.

CHAR.—Bill shorter than the head, extremely robust, not very acute; its height at base nearly a third of its total length along culmen; prominence at symphysis well marked, but not very acute, situated so far back as to make the gonys equal in length to the rami, reckoning from the termination of the feathers on the side of the mandible. Culmen very convex; gonys straight; commissure gently curved. Wings exceedingly long, and acute; each feather a full inch longer than the next. Tail rather short, contained $2\frac{1}{2}$ times in the wing; in form deeply emarginate, but its lateral feathers without the elongation of *Sterna*. Feet long and stout; tarsus a little shorter than the bill, exceeding the middle toe and claw. Hind toe well developed; inner shorter

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* Several authors not mentioned in our former work may here be briefly cited.
Borellus, De Motu Animalium.
Camper, Beobachtungen der Berlinischen Gesellschaft, vol. i. 1787.
Von dem Fluge der Voegel, Schriften der Berlinischen Gesellschaft, vol. ii. 1781, p. 214.
Mayer, Das aufrecht Stehen. Mueller's Archiv, vol. xx. 1853, p. 9.
Fick, Ueber die Gestaltung der Gelenkflaechen. Mueller's Archiv, 1853, vol. xx. p. 657.
Schuebler, Bedeutung der Mathematik fuer die Naturgeschichte. Jahreshefte des Vereins fuer Vaterlandskunde, Stuttgart, 1849.
Dr. J. Aiken Meigs, Relation of Atomic Heat to Crystalline Form, vol. iii. Jour. Acad. Nat. Sc. Philadelphia, 1855-58, p. 105.
Prof. Popoff, Description de la Courbe fruiforme. Bulletin de la Société des Naturalistes de Moscou, 1859, part i. p. 283.
Zeising, Ueber die Metamorphosen in den Verhaeltnissen der menschlichen Gestalt. Acta Academiæ Cesareæ Leopoldino-Carolinæ, vol. xxvii. part ii.

than outer; interdigital membranes deeply incised, especially the inner. Tail and rump concolor with the back. Size moderate.

Gelochelidon is a well-marked generic form of the *Sterninæ*, embracing several species agreeing in their short, very robust bills, exceedingly long wings, lengthened tarsi, and short tail,—which latter never attains the deeply-forked shape of typical *Sternæ*. It differs in coloration above from most of the other genera of Terns, in having the pearl blue mantle continued over the rump and tail.

The name *Gelochelidon* was proposed by Brehm two years before Wagler instituted his genus *Laropis*. Both are founded upon the same type,—*S. anglica*, Mont.

GELOCHELIDON ANGLICA Bp. ex Mont.

Sterna anglica, Montagu, and of authors.
Thalasseus anglicus, Boie, Isis, 1822, p. 563.
Laropis anglica, Wagler, Isis, 1832, p. 1225.
Gelochelidon anglica, Bp. Comp. List, 1838, p. 61.
Gelochelidon palustris, Macgill., Man. Orn., 1842, ii. p. 237.
Sterna aranea, Wilson, Am. Orn. Lawrence, Gen. Rep., 1858, p. 859.
Gelochelidon aranea, Bonap., Comp. List, 1838, p. 61.

DIAG.—*Sterna* rostro breve, robustissimo, nigro; dorso cærulescente-perlaceo, uropygio caudaque concoloribus; remigibus primariis argentato-griseis, vix albo intus marginatis, nisi basin versus; corpore subtus albo, pedibus nigris.

Habitat.—Atlantic Coast of America, from Massachusetts southward. Europe.

This species differs from all the other Terns of North America, except *Sterna antillarum*, in having the rump and tail of the same color with the back. Its primaries differ from other species—though approaching nearest to *Thalasseus caspius*—in having the inner webs white for a comparatively short space; and the white is not pure, nor is there a very trenchant line of division between it and the dark portions of the feathers.

I have not a sufficient number of skins before me for a perfectly satisfactory comparison of the birds of the two continents, but, so far as I can judge, I am decidedly inclined to agree with Audubon in opinion, that no difference exists. I have minutely compared the specimens before me, and found them absolutely identical in every particular of size, form and color.

The American bird was first described by Wilson, under the name of *Sterna aranea*, that author, perhaps, considering it distinct from, but much more probably being unaware of the existence of, the European bird. It was very properly referred by subsequent American writers,—Nuttall, Audubon, and Bonaparte up to 1838,—to the latter. At that date, in his Comparative List, Bonaparte distinguishes it from the European bird under the name of *Gelochelidon aranea*, and his example has been generally followed by writers since that time.

Genus THALASSEUS Boie.

Thalasseus, Boie, Isis, 1822, 563. Type *S. caspia*, Pall.
Hydroprogne, Kaup, Sk. Ent. Eur. Thierw., 1829, 71. Same type.
Sylochelidon, Brehm, Vög. Deutsch. 1830. Same type.
Helopus, Wagler, Isis, 1832, 1224. Same type.
Actochelidon, Kaup, Sk. Ent. Eur. Thierw., 1829, 31. Type *S. cantiaca*, Gm.

CH.—Size very large, large, or moderate; general form more or less robust; a decided occipital crest. Bill as long as, or longer than, the head, robust, height at base a third to a fourth the length of culmen. Culmen variable in amount of curvature; position of the angle at symphysis variable. Wings moderately long (for this subfamily); pointed and acute; but the first primary not surpassing the second by as much as the latter surpasses the third. Tail moderate or short; in the type of the genus very short, being contained three times in the wing, and but moderately emarginate; in other species more

elongated and more deeply forked, and contained only about twice in the wing. Feet short and stout, black; tarsi about two-thirds the bill, or rather less; as long as, or slightly longer than, the middle toe and claw. Webs moderately incised, the inner the most so. Hind toe very short.

This genus, as at present constituted, is chiefly distinguished from *Sterna* by its large size and general robust form, stout bill and feet, and (in typical species) much shorter and less forked tail. In the preceding diagnosis I have been obliged to define the genus with considerable latitude from the somewhat dissimilar types at present retained in it. Thus, if we take the *Th. caspius*, and *Th. cantiacus*, which may be considered as representing the two extremes of form, we shall find great discrepancies in such important features as shape and robustness of bill, amount of emargination of tail, &c.; and regarding these extremes alone, might well be inclined to separate them. Examination, however, of intermediate species, such as *T. regius* and *elegans*, of North America, *T. velox*, of Europe, &c., will show so gradual a transition in nearly every feature, from one extreme to the other, that it becomes exceedingly difficult to draw a line which shall naturally divide the group into two or more genera. In view of the above facts, I prefer, for the present at least, to retain the several species under a single genus, as they certainly do differ, markedly, from *Sterna* in important characteristics, although presenting the above discrepancies among themselves.

It is not impossible, however, that *T. caspius*, with one or two other very closely allied species from various parts of the world, may be, without impropriety, separated generically from the others. This species is typical of a group, all intimately allied, which are pre-eminently distinguished by their exceedingly large, high, robust bills, very stout feet, remarkably short tails,—the lateral feathers of which are scarcely at all elongated, and are not tapering nor acuminate,—and general large powerful form. The genus might, by the exclusion of this form, be greatly restricted, and much more rigidly defined.

Of the five synonyms given at the head of this article, all, with the exception of *Actochelidon*, (the type of which is *S. cantiaca*, Gm.) are based upon *S. caspius*, Pallas. Of these *Thalasseus*, of Boie, has priority in point of date, and is the name to be adopted for the genus. Boie's genus, however, is considered to be based upon *S. caspius*, merely from the fact of that species being the first mentioned, no particular type being indicated. In the event of the separation of *S. caspius* and its intimate allies, above suggested, it might be well to apply the name *Hydroprogne* to the restricted group, *Thalasseus* being used to designate the remaining species. In view of the very slight reasons for considering *Thalasseus* as having special reference to *S. caspius*, such a procedure would be hardly, if at all, an infringement on the rules of nomenclature, and would obviate the necessity of presenting *regia*, *elegans* and their congeners under a generic designation not before employed,—viz.: *Actochelidon*.

THALASSEUS CASPIUS Boie ex Pall.

Sterna tschegrava, Lepechin, Nov. Com. Pet. xiv. p. 500.
Sterna caspia, Pallas, Nov. Com. Pet. xiv. p. 582. Lawrence, Gen. Rep. Birds, 1838, p. 859, and of most authors.
Thalasseus caspius, Boie, Isis, 1822, p. 563.
Hydroprogne caspia, Kaup, Sk. Ent. Eur. Thierw., 1829, p. 91.
Helopus caspius, Wagler, Isis, 1832, p. 1224.
Sylochelidon caspia, Brehm, Bonaparte, Comp. List, 1838. Lawrence, Proc. N. Y. Lyc. Nat. Hist., 1850, v. 37.
Sterna megarhynchos, Meyer, Taschenb. Deuts., ii. p. 457.

DIAG.—T. rostro maximo, robustissimo, rubro; palpebris inferioribus albis; remigibus griseo-fuscis, suprà argentatis, nec intus albis; caudâ breviore, emarginatâ; pedibus validissimis, nigris, digito medio cum ungue tarso breviore.

Habitat.—In America, the interior of the Fur Countries; Hudson's Bay; Labrador; in winter ranging southward along the Atlantic Coast as far as New Jersey.

This species in all its stages of plumage is too well known to require any further description.

Quite a large series of American skins, of all ages, compared with two fully adult birds from Europe, constantly differ in size and proportion, as shown by the following measurements:

Comparative measurements of American and European Birds.

	American.	European.
Length of bill along culmen	2·75*	2·40
" " " gape	4·00	3·55
Height " at base	0·90	0·75
Width " opposite nostrils	0·50	0·50
Length of wing from flexure	16·50	15·00
" " tarsus	1·75	1·65
" " middle toe and claw	1·65	1·55
" " tail	5 75	5·25

The above measurements indicate the average of the specimens from both countries before me, from which it will be seen that the American bird is decidedly the larger. While the bill is nearly a third of an inch longer, it is also especially remarkable for its great comparative height at the base, and its width at base being no greater than in the European bird, gives it quite a different shape. The next most patent difference lies in the length of wing from the flexure, in which the American bird surpasses the European by fully $1\frac{1}{2}$ inches. Specimens of both, of course, differ among themselves to a degree; but the greatest variation in adult American skins is hardly half an inch. The wing of the adult European bird, indeed, hardly equals that of a young bird of the year from America; and it is well known how much smaller are the young of all Terns than the adults. The tarsi and toes of the two, as well as the tail, differ in a considerable degree, but not so markedly as do the bill and wings. I find no differences whatever in the color of the two birds.

With but two specimens of the European bird before me, I do not venture to formally separate from it its North American representative. But should these examples prove to represent fairly the characters of the European bird, and the discrepancies in size and proportion above pointed out prove constant, I should not hesitate to do so. In that event I would propose for our bird—in the absence of any very peculiar characters on which to base a name, and in view of the fact that it is the largest and most magnificent Tern of our continent—the name of THALASSEUS IMPERATOR.

The following would be its diagnosis:

Th. Thalasseo caspio coloribus similis; sed omnino major, rostro etiam validiore, longiore, altiore nec latiore. Rostr. long. 2·75 poll.; alæ 16·50.

The proper specific appellation of the Caspian Tern is not "*caspia* Pallas," but "*tschegrava* Lepechin," which latter name is proposed in the same work in which Pallas calls the bird "*caspia*," but has priority by several pages. As, however, the word is not only barbarous, but also exceedingly cacophonous, and especially as *caspia* has become so well established by common consent, I do not think it would be expedient to supersede Pallas' name, in view of the very slight priority of that of Lepechin.

THALASSEUS REGIUS Gambel.

Sterna cayana, Bon., 1828; Nutt., 1834; Aud., 1839 and 1844; but not of Latham.

* Inches and hundredths.

Sterna regia, Gambel, Pr. A. N. S. Ph. iv. 1848, 128.
Thalasseus regius, Id. J. A. N. S. Ph. i. 2d ser. 1849, 228.

Diag.—Thal. rostro magno, robusto, nec peracuto, aurantio-rubro; remige primâ internè albâ nec ad apicem extensâ marginatâ; pedibus nigris, medio digito cum ungue non tarso breviore. Long. rost. 2·60 poll.; alæ 14·50; tarsi 1·30.

Habitat.—South Atlantic Coast of America; Antilles in winter. California.

A good series of this bird, collected in Jamaica, enables me to give its winter plumage, as well as that of the young of the year.

Winter Plumage.—Bill less brightly colored than in summer, its tip and cutting edges dull yellowish. Front white, crown variegated with black and white, the former color increasing on the occiput and nuchal crest, which latter, though shorter than in summer, is almost or quite unmixed with white. This black extends forwards on the sides of the head to the eye, which it includes. The tail is not pure white, as in summer, but is glossed over with the bluish of the mantle, which deepens towards the tips of the feathers into dusky plumbeous. Otherwise as in summer.

Young of the Year in August.—Bill considerably smaller and shorter than in the adult; its tip less acute, and its angles and ridges less sharply defined; mostly reddish-yellow, but light yellowish at tip. Crown much as in the adults in winter; but the occipital crest scarcely recognizable as such. Upper parts mostly white; but the pearl-gray of the adults appearing in irregular patches, and the whole back marked with small, irregularly-shaped, but well-defined spots of brown. On the tertials the brown occupies nearly the whole of each feather, a narrow edge only remaining white. Lesser wing coverts dusky plumbeous. Primaries much as in the adults, but the line of demarcation of the black and white wanting sharpness of definition. Tail basally white, but soon becoming plumbeous, then decidedly brownish, the extreme tips of the feathers again markedly white. Otherwise as in the adults.

The species is so distinct from any other of North America, that it hardly requires comparison. *Caspius* is most closely allied (except *elegans*) and has been confounded with it. But the differences between the two are very great. *Regius* is a much smaller bird, its wing two inches or more shorter. The bill is nearly or quite as long, but it is much slenderer and every way weaker. The tail is very decidedly longer and more forked, almost equalling in this respect *elegans* or *acuflavidus*. The feet, with the same relative proportions of tarsus and toes, are proportionally shorter. In color the two are quite similar, except in the primaries where a very marked difference is observable. The inner webs of *caspius* are wholly dull hoary plumbeous ash; while the inner web of *regius* has a very sharply defined white margin, as in *elegans* or *acuflavidus*, and *Sternæ* generally.

But while there is thus no difficulty in separating it from its North American allies, the case is quite different from the Central and South American species, with which it is more or less intimately related. It was, up to 1848, confounded with *S. cayana*, Lath. (*S. cayanensis*, Gm.) This error was first corrected by Gambel (l. c.), and a distinct name imposed. It is difficult, perhaps impossible, to determine to what species Latham's name is to be referred. His brief diagnosis is "St. griseâ, pennis rufo-marginatis, occipite nigro, corpore subtus albo. Habitat in Cayana. 16 pollices longa." This description is evidently that of a young bird. Gambel is inclined to consider it as "the immature plumage of one of the yellow-billed species of the Brazilian coast, figured by Lichtenstein, probably *S. magnirostris*." He further remarks that "young birds of our species would agree pretty well with the *erythrorhyncha*, of De Weid, as they are somewhat smaller and less proportioned."

There is a specimen in the Smithsonian collection, presented by Mr. Sclater, from Jamaica. It was killed March 23d, and is in moult; probably, a young bird putting on its first spring livery, though still retaining its winter marks of

white front, etc. At first sight it was referred to *T. regius*, but on closer examination several important discrepancies were observed. The bill, though just about as long as in *regius*, was very decidedly smaller, weaker, with the angle at symphysis less developed; it was of a clear straw-yellow, and in size and shape about intermediate between *regius* and *elegans*. The lateral tail feathers appear broader and rounded at their tip, instead of tapering and attenuated. An important difference is seen in the feet, the middle toe and claw being decidedly longer than the tarsus, instead of equal to it. Mr. Sclater did not label this bird, and I am equally uncertain what name to apply. It seems to be not at all improbable that it may be the *S. cayana*, of Latham, and, if so, would substantiate Gambel's position, for it is certainly not the bird he named *regia*.

THALASSEUS ELEGANS Gamb.

Sterna elegans, Gambel, Pr. A. N. S. Ph. iv. 1848, 129. Lawrence, Gen. Rep. Birds, 1858, 860. Atlas, pl. xciv.

Thalasseus elegans, Gambel, J. A. N. S. Ph. 2d ser. i. 1849, 228.

DIAG.—*Th. Thalasseo regio* similis; sed multo minor, rostro graciliore, digito medio cum ungue tarso breviore; corpore subtus rosaceo-albo.

Habitat.—Coast of California.

The most striking morphological character of this species, as compared with its nearest ally, *T. regia*, is the comparative length of the tarsus and toes. In *regia* the middle toe is, with the claw, just as long as the tarsus; while the same parts in *elegans* are very considerably shorter.

This beautiful species has been so accurately described by its discoverer, and its affinities so correctly indicated, that any further remarks upon these points would be *de trop*. It is as yet almost unknown in cabinets. A very fine specimen, in winter plumage, has been deposited in the Smithsonian by J. Hepburn, Esq., and is the original of the plate above cited. It agrees minutely with Gambel's description.

THALASSEUS ACUFLAVIDUS (Cabot).

Sterna Boysii, Nuttall, Man. Orn. ii. 1834, 276. Sed non Lath., 1790.

Sterna cantiaca, Audubon, Orn. Biog. iii. 1835, 531. Id. B. A. vii. 1844, 87. Sed non Gmel., 1788.

Sterna acuflavida, Cabot, Proc. Bost. Soc. N. H., 1837, ii. 257. Lawr. Gen. Rep. 1858, 860.

Thalasseus acuflavidus, ——— ?

DIAG.—T. *Thalasseo cantiaco* staturâ, formâ, coloribusque omnino similis; sed margine albâ pogonii interni remigis primæ angustiore, nec in apicem pennæ porrectâ.

Habitat.—Atlantic Coast of North America, ranging into the Antilles in winter.

The young of the year is considerably smaller than the adult (wing ½ inch shorter) as is usual in this subfamily. The bill is shorter and weaker, and is without any very distinct definition of angles and ridges. It is brownish black, the extreme point only yellowish. The crown, front and nape are brownish black, variegated with white, the white touches very small on the front. The upper parts are as in the adults; but everywhere marked with irregularly-shaped, but well-defined spots and transverse bars of decided brownish black. There is no well formed occipital crest, until after the first moult. The primaries are like those of the adults. The tail, however, is very different. The feathers for three-fourths their length are of the color of the back; this color gradually deepens, until towards the tips it becomes brownish black,—each feather having a terminal irregular edge left whitish. The tail, in shape, is simply deeply emarginate, the outer feathers being but slightly longer than the second.

In winter the yellow tip of the bill of the adults decreases in extent and intensity of color; the front is white, either pure or speckled with black; the crown variegated with black and white; but the long occipital crest, which does

not disappear at this season, remains of an unmixed brownish black. The lateral tail feathers are shorter. The bird otherwise as in summer.

At all seasons the yellow tip of the bill varies in extent, and it also presents a varying regularity and sharpness of division from the black. I am inclined to think that the extent of the yellow depends upon the age of the bird: its intensity upon the season. The longest yellow tip before me measures three-fourths of an inch, the shortest one-fourth. In a large series of specimens the tarsi and toes scarcely differ appreciably. The markings of the primaries, in their extent and disposition, are also remarkably constant. The variation in length of wing from flexure in adult summer birds is about half an inch. The tail varies somewhat in depth of fork, but is always less than in the species of *Sterna* proper.

A series of winter skins from Jamaica in, probably, their first moult, differ from adult examples from various points on the Atlantic Coast in being every way considerably smaller. The bills are about a third of an inch shorter than the average; and other parts differ proportionally.

The American Sandwich Tern was first separated from the European by Cabot, (l. c.) in 1847. Most of the points of difference, however, assigned by that writer, disappear when large series from both continents are compared. The difference in the measurements given exists equally in individuals of both species; for, as will be seen from the above remarks, specimens vary greatly in these respects. After an attentive examination of a large number of skins, I can appreciate no differences whatever in these respects; and in size and proportions, of bill as well as of the whole body, the two appear identical. Neither can distinctive characters be drawn from the yellow tip of the bill. In both species the line of union of the yellow and black is equally irregular, depending for its exact character on the age of the bird. In both, the yellow runs along the gonys, nearly or quite to the angle at the symphysis. It also extends, but in a less degree, along the ridge of the upper mandible, and even for a little way on the cutting edges of both mandibles. The outline of the yellow on the sides of the bill is also more usually concavo-convex than perfectly straight and perpendicular. The trenchant line of union, which existed in the specimen described by Cabot, must have been rather exceptional. I cannot appreciate any difference in the width of the bills of the two in the series before me. A discrepancy in the claws of the two does not exist as constant.

We are reduced, therefore, in separating the two birds, to the single remaining character given by Cabot,—that of the primaries. These parts in the American bird are not darker than those of the European, since their color depends on their age; but a decided difference in the white margins of the inner webs exists uniformly in all the specimens from either country that I have ever examined. In the European bird the white of the inner web of the first primary occupies at the base nearly the whole of the web, the dark portion being merely a narrow line along the shaft. This black portion widens but little as it runs along the feather, so that the white border extends quite broadly to the very tip of the feather, which it entirely occupies. In the American, on the contrary, the black portion is in its whole length wider, and, about one and a half inches from the tip becomes quite suddenly very decidedly broader, so much so as nearly to cut off the white, which latter continues forward a little further, but only as a very narrow bordering line, and finally disappears before it reaches the tip. The same holds good, though somewhat less markedly, of the second, third and fourth primaries. The following would therefore constitute the

Differential diagnoses of the American and European Bird.

Th. cantiacus.—White margins of inner web of outer three or four primaries wide, extending quite to tip, which it wholly occupies. Breadth of white portion 1½ inches from tip of first primary, ·25 of inch.

Th. acuflavidus.—White margins of inner web of three or four outer primaries narrow, falling short of tip, which is wholly occupied by the black portion. Breadth of white margin 1½ inches from tip of first primary, ·10 of an inch.

Genus STERNA Linnæus.

Sterna, Linn., Syst. Nat. 1748. Type, *S. hirundo*, Linn.
Thalassea, Kaup, Sk. Ent. Eur. Theirw. 1829, p. 97. Type, *S. paradisea*, Brün.
Hydrocecropis, Boie, Isis, 1844, p. 178. Type, —— ? (includes *S. paradisea.*)
Sternula, Boie, Isis, 1822, 563. Type, *S. minuta*, Linn.

Ch.—Head without a decided occipital crest, but the feathers of the parts somewhat elongated; size moderate, or very small; general form slender and graceful. Bill about as long as, or slightly shorter than, the head, greatly exceeding the tarsus; of varying stoutness, but usually quite slender, very acute, the culmen gently curved, being slightly declinato-convex. Commissure gently curved; outline of rami a little concave, of gonys quite straight, the angle at symphysis well marked and acute, but not very prominent. Wings long and pointed. Tail of variable length and amount of forfication, but always decidedly greatly forked; the lateral feathers elongated, slender and tapering, greatly surpassing the others. Tail contained in the wing of the type of the genus about 1¾ times; in *arctica* 1½ times; while the tail of *paradisea* is but little less than the wing. Tarsus slender, slightly shorter than the middle toe and claw, slightly longer than the middle toe alone; much shorter than the bill, about equal to the distance between the projection at symphysis and the tip of the inferior mandible.

The genus *Sterna*, in the restricted acceptation in which it is employed by most modern authors, embraces quite numerous species, all more or less intimately related to *S. hirundo*. The group is one well defined, its species agreeing very closely in size, general form, pattern of coloration, and seasonal changes of plumage. Specific characters are generally found in the varying length and stoutness of bills and tarsi, amount of forking of the tail, markings of the primaries, and other less decided features of coloration.

Sterna proper has comparatively few synonyms, the principal of which are those given at the head of this article. *Thalassea*, Kaup, and *Hydrocecropis*, Boie, are strictly synonymous, while *Sternula*, Boie, is based upon a species differing but very slightly from the type, *S. hirundo*.

"Sterna Trudeaui Aud."

Sterna Trudeaui, Audubon, Orn. Biog. v. 1839, 125. Lawr. Gen. Rep. Birds, 1858, 861.

I have before me a typical specimen of *Sterna Trudeaui*, belonging to J. P. Giraud, Jr., the one from which was drawn up the description in the General Report, and supposed to be also the original of Audubon's plate and description. As these are the chief descriptions of the bird which have ever appeared, and as, I believe, the specimen is the only one known to exist, it may fairly be considered to embody all that is at present known of the species. From the peculiar characters presented by it, as well as by the species which succeeds, —to both of which attach, for various obvious reasons, doubts as to validity, —it may be of advantage to examine somewhat closely into its characters, to determine if possible whether they be distinct from each other; and in that case in what they differ from *S. Forsteri.*

The bill is quite stout at the base, both as regards height and width, and tapers regularly to an acute point, the culmen being but slightly arcuate. It is precisely the length of that of an adult *Forsteri*, and also of a supposed *Havelli.**

* The specimens of "*Havelli*" referred to, are those furnished by Mr. Lawrence, and so labelled by him.

It is bright yellow at the tip for exactly the same distance as is the bill of "*Havelli*;" but the base, for nearly a third of the length of the bill, appears to have been in life bright orange yellow, so that only the middle of the bill is left black; whereas, in "*Havelli*," the bill is black from its yellow tip quite to the base of the upper mandible, and only a small space on the under mandible is left yellow. The front and crown are white, passing into light pearl blue on the nape, exactly as in "*Havelli*;" the circumocular fascia also exists, but it is somewhat narrower than in that species. The other upper parts are of exactly the shade of *Forsteri* or "*Havelli*;" but this color extends around the sides of the neck quite to the throat, and occupies the whole under parts of the bird, not even excepting the under tail-coverts, whereas in "*Havelli*" and *Forsteri*, the color of the same parts is nearly or quite pure white. The rump is white, as in both those species. The tail is elongated;—exactly intermediate between a full plumaged summer *Forsteri* and "*Havelli*;" it has precisely the color of the latter, the inner web of the lateral feather being somewhat lighter than in the former. The wings, in their markings and length, are identical with those of either *Forsteri* or "*Havelli*;" the tarsi and toes are fractionally of the same length, and appear of about the same color in the dried skin.

The differences therefore between "*Havelli*" and "*Trudeaui*," lie entirely in the following features: 1st. The bases of both mandibles are orange yellow for nearly half their length in "*Trudeaui*," while in "*Havelli*" a very small portion of the under mandible only is light colored. 2d. The color of the back extends undiluted over the whole under parts of "Trudeaui," while the same parts in "Havelli" are white.

The greater slenderness of the bill, and the shorter tarsi, given by Audubon as characteristic of "*Trudeaui*," in comparison with "*Havelli*," do not exist, provided the specimens before me exhibit the characters of the latter. Indeed, a comparison of fourteen specimens of *Forsteri*, three of "*Havelli*," and the single "*Trudeaui*," shows the three to be surprisingly similar in every detail of size and proportions; the bills and tarsi particularly, hardly differing as much in length as do these parts in different individuals of *hirundo* or *macroura*.

Should the color of the bill and of the under parts of "*Trudeaui*,"—more particularly the latter—prove constant, they would be abundantly sufficient to separate it from any other species. The only question is, whether the specimen under consideration is not in an entirely accidental and abnormal state of plumage, to be placed in the same category with albinism, melanism, &c. Although Audubon states that he saw other individuals like the present specimen, it appears to be the only one ever actually examined. The question is one of great interest, but one of which, unfortunately, we are no nearer the positive solution than we were twenty years ago; and I am therefore obliged *rem in medio relinquere.*

"STERNA HAVELLI Aud."

Sterna Havelli, Audubon, Orn. Biog. v. 1839, 122. Lawrence, Gen. Rep. Birds, 1858, 861.

So accurate a description of the winter plumage—the only one known—of this supposed species has been given by its discoverer, that it is unnecessary here to repeat it. A discussion of the essential characters assigned to it, to discover exactly what are its claims to specific distinction, may be given.

It is not a little singular that, of a species recognized for more than twenty years, the nuptial plumage should be still quite unknown. I am not aware that a specimen which could be referred to this species has ever been taken in spring or summer. There can be no doubt, however, that at that season it obtains the black pileum common to all the species of the genus,—with, probably, not even the exception of "*Trudeaui*." A specimen before me, which agrees more closely than any other with Audubon's plate and description, has the crown and occiput very noticeably variegated with black; this color, indeed,

being almost unmixed with white on the extreme nape. The front alone is white. The character, therefore, of a black ocular fascia, and white crown, cannot be considered as diagnostic of the adult full-plumaged bird.

The chief, and, indeed, the only point to be examined, is the relationship of this species with the *S. Forsteri*,—winter specimens of which agree very closely with it. In discussing this question, it must be borne in mind that Audubon was entirely unacquainted with *S. Forsteri*, or at least did not recognize its claims to specific validity, as distinct from *S. hirundo*. Indeed, if we compare Audubon's description of his "*Havelli*" with a winter specimen of *S. Forsteri* it will be found that they correspond minutely in every particular of size, form and colors; and the characters given apply as well to the one as to the other. For, though summer specimens of *Forsteri* are quite different in the elongation of the tail, color of bill, black pileum, &c., yet in winter these features are quite changed, the tail becoming shortened, the bill blackened, and the pileum restricted to a circumocular fascia. Basing an argument, therefore, upon these data, "*S. Havelli*, Aud.," might, without the slightest impropriety, be reckoned as a synonym of *S. Forsteri*.

Three Terns, obligingly furnished for examination by Mr. Lawrence, and labelled by him "*Havelli*," differ in some respect from any winter skins of *Forsteri* which have as yet fallen under my observation. Their size and proportions, length of tarsi, elongation of tail, &c., are quite identical. The most perfect of these,—evidently an adult bird in full winter plumage,—has a stout bill, almost black, its tip for more than a fourth of an inch bright yellow. The bill in fact looks something like that of *Thalasseus cantiacus* or *acuflavidus*. There is a well-defined lateral stripe on the head; the whole crown is pure white, and even on the nape there are no traces of black, that part being light pearl color, much as the back. But the most distinctive feature of this specimen is that the tail is entirely very light pearl, the inner web of the lateral feather being scarcely, if at all, darker than the outer. A second specimen, a younger bird apparently, and evidently, from the ragged dull brown condition of its primaries, in moult, has the same decided character of tail as has the first one. The bill is even stouter at the base, and the extreme point only is slightly yellowish. The whole crown is variegated with black and white, the former being left nearly pure on the nape. The third specimen is quite like the last, but the inner web of the lateral feather is quite decidedly dusky, showing an approach to *S. Forsteri*. It will be noticed that where these three specimens are quite identical with each other, in size and proportions, they differ among themselves in colors, both of bill and feathers, and show quite a gradation towards *S. Forsteri*.

From the above remarks it will be seen that the question really hinges upon the following point, as yet not positively determined: Does the *S. Forsteri* in winter, when fully adult, ever acquire a very broad bright yellow tip to its otherwise wholly black bill, and lose entirely the dark character of the inner web of its exterior tail feather?

Now it is well known, that the younger a Forster's Tern is, the darker is the inner web of the lateral feather; and the natural inference from this fact is, that with increasing age the inner web may become nearly or even quite as light as the outer. With regard to the broad yellow tip of the bill, it will be noticed, that of the three specimens purporting to be "*S. Havelli*," each one varies in this particular; so that it would be quite impossible to consider it as diagnostic. Therefore, though unable to prove the point incontrovertably, I am decidedly of opinion that *Sterna* "*Havelli*," is merely the adult winter plumage of *S. Forsteri*, and not a distinct species.

Sterna Forsteri Nuttall.

Sterna hirundo, Sw. et Rich., F. B. A., 1831, ii. 412, nec Linn.

Sterna Forsteri, Nuttall, Man. Orn., 1834, ii. p. 274 (in note to *S. hirundo*), and of authors.

DIAG.—S. *Sternæ hirundini* similis: sed rostro longiore, valdè robustiore, tarsis longioribus, validioribus; caudâ magis productâ, perlaceâ, rectrice laterali pogonio interno fusco-griseo, externo albo.

Habitat.—Very extensively distributed over North America. Atlantic Coast and Gulf of Mexico. Fur countries. Great Lakes and Rivers. Texas. Utah. California.

In view of the considerations presented in the two preceding articles, it may be well to look somewhat carefully into the characters of the present species.

Adult, spring plumage.—Bill orange-yellow, black for nearly its terminal half, the extreme points of both mandibles yellowish; robust, deep at the base; culmen markedly declinato-convex, eminence at symphysis well developed; in total length from one to two-tenths of an inch longer than in *S. hirundo*. The black pileum does not extend so far down on the sides of the head as it does in *hirundo*, barely embracing the eye (the lower lid of which is white), and leaving a considerably wider white space between the eye and commissural edge of superior maxilla than in *hirundo*. The color of the back hardly differs appreciably from that species; it is perhaps a shade lighter. The wings are comparatively considerably shorter than in *hirundo*, being absolutely a little less, though *Forsteri* is a larger bird. They are very light colored, being strongly silvered with the peculiar hoariness common to most of the species of the genus; this lighter color is very observable even on the coverts. The outer web of the first primary is not black, but silvery like the others; all the primaries want the very decided white space on the inner webs which exists in *hirundo* and *macroura;* there are indications of it, indeed, on the three or four outer primaries, but the others are a nearly uniform dusky-gray, moderately hoary. The entire under parts are white, with scarcely a trace of the plumbeous which is so evident in *hirundo*, and amounts to so decided a color in *macroura*. The tail is a slightly lighter shade of the color of the mantle, separated from the latter for a short space by the decidedly white rump. The lateral feathers are much more lengthened than in *hirundo*, the elongation generally quite equalling that of *macroura*, and sometimes even exceeding it. These two lateral feathers are white on the outer web, dusky-gray on the inner. This being exactly the reverse of *hirundo*, and a very noticeable feature, was the first to draw attention to the bird, and this character being so tangible and convenient, writers have perhaps laid too much stress upon it, to the exclusion of others, quite as evident and more important. The feet are bright orange, tinged with vermillion; the tarsus shorter than the middle toe and claw; the feet longer and stouter, by over ·10 of an inch, than the sames parts in *hirundo*.

When the primaries become old, *i. e.*, at the approach of the spring or autumn moult, before the species begins to put on its complete summer or winter livery, the primaries lose their beautiful silvering, and become plain brown, their shafts inclining to decided yellow. They have then also distinct white spaces on their inner webs, nearly as well marked as in *hirundo* or *macroura*.

Adult, winter plumage.—The bill loses the bright orange-yellow which exists in summer, the black encroaching upon it, so that it becomes almost wholly dusky. The base of the under mandible in dried skins appears as if it might have been flesh-colored in life. The feet also lose their bright color, and incline to a dusky-yellowish. The black pileum is more or less mixed with white, the white predominating on the forehead so as to leave it nearly pure; there is always considerable black left on the nape, and also a broad band on the side of the head, embracing the eye, and reaching to the nape behind, exactly as represented in Audubon's plate of *S. Havelli*. The long lateral tail feathers become greatly shortened, so as to be but scarcely, if at all, longer than those of *hirundo* during the breeding season. The color of the inner webs becomes darker, though it does not extend so far towards the base of the feather; sometimes it invades the outer web also, towards the tip.

Young of the year, before the first moult.—Bill every way considerably smaller,

shorter and weaker than that of the adult, and wanting its very acute tip, and sharply-defined ridges and angles; brownish-black, fading into dull flesh-color at the base of the under mandible. Front white, but the crown and nape show considerable traces of the black that is to appear, which is now mixed with a good deal of light-brown. The pearl-blue of the back and wing coverts is everywhere interrupted by irregular patches of light grayish-brown, showing a tendency to become transverse bars; this grayish-brown on the tertials deepens into brownish-black, and occupies nearly the whole extent of each feather. The primaries differ from those of the adult in having less of the silvery gloss, and the inner white spaces are more marked, being in fact much like those of the adult *hirundo*. The rump and under parts are pure white. The tail intensifies, so to speak, its adult characters as regards color; and, independently of any other feature, will always serve to identify the species. It is deeply emarginate, but the lateral feather is not greatly produced, surpassing the second by scarcely more than the latter surpasses the third. Its inner web for an inch or so from the tip, and both webs of the other feathers, are quite decidedly grayish-black; the intensity of this color, and also its extent, decreasing successively on each feather from without inwards, so that the central pair scarcely deepen their color at the tips. The outer web of the lateral feather generally stays pretty uninterruptedly white, but sometimes is just at the tip invaded by the darker color of its inner web.

The preceding descriptions embrace all the well characterized stages of plumage of this species which are known to me, though there are, of course, intermediates in great variety between those given. It is indeed a little remarkable, the number of specimens in immature or winter plumage which find their way into collections. Of the numerous examples before me, just one-half are in this state, all showing white fronts, and the usual deep black band through the eye. There would seem to be something peculiar in the habitat of this species, to cause it to differ so remarkably from its allies *hirundo* and *macroura* in this respect. I have purposely gone considerably into detail regarding these immature stages, because of the great similarity which exists between the species, and the same ages of "*S. Havelli*," if, indeed, the latter be really distinct from it. The question of the relationship of the two has been fully discussed under the head of "*S. Havelli*."

Sterna Forsteri affords a good illustration of a species, bearing so intimate a general resemblance to another, as to be confounded with it at first glance, and yet when carefully examined proving to be totally distinct. It is perfectly easy to separate it from the *hirundo* by its characters of bill, wings, tail or feet, either of which taken alone would identify it. The following table will exhibit at a glance the distinctive features of our three most intimately allied species, between which, it will be observed, there is a complete and gradual transition in almost every respect.

Differential Diagnoses of S. Forsteri, hirundo and macroura.

S. Forsteri.—Bill (average) 1·60 along culmen; depth at base ·40; robust. Bill orange-yellow, nearly its terminal half black. White space between eye and cutting edge of upper mandible broad. Under parts white. Outer web of first primary silvery; the inner webs also of the others strongly hoary, without well-defined white spaces. Tail bluish-pearl, like the back, its lateral feather greatly produced (average nearly 7 inches in length); its outer web white, inner the color of the rest of the tail. Legs long and stout; length of tarsus (average) rather over ·90 of an inch; orange-yellow, tinged with vermilion. Length of tarsus, middle toe and claw 2 inches.

S. hirundo.—Bill (average) 1·45 along culmen; depth at base ·33; moderate. Bill vermilion-red; its terminal third black. White space between eye and cutting edge of upper mandible narrower than in *Forsteri*. Under parts lightly washed with plumbeous, fading into white on the throat and abdomen. Outer

web of first primary black; inner webs of the others somewhat hoary, with well defined white spaces. Tail white, different from the back, its lateral feather moderately produced (average 6 inches in length); its outer web grayish-dusky, inner white. Legs moderate; length of tarsus about ·80 of an inch: light vermilion-red. Length of tarsus, middle toe and claw 1·75 inches.

S. macroura.—Bill (average) 1·30 along culmen; depth at base ·30; slender. Bill wholly deep carmine-red. White space between eye and cutting edge of upper mandible narrower than in *hirundo*. Under parts decidedly plumbeous, extending from vent to throat, both of which become abruptly white. Primaries as in *hirundo*. Tail with the elongation of *Forsteri*, or rather exceeding it (average 7·50 inches), and the color of *hirundo*. Legs very short and slender; length of tarsus (average) ·65 of an inch; deep vermilion, almost lake. Length of tarsus, middle toe and claw, about 1·50 inches.

Comparison of the young of the year of S. Forsteri and hirundo.—The bill and feet constantly present differences proportional to those which exist in the adults, as regards length and stoutness. The bill of *hirundo* is more decidedly yellowish at the base of the lower mandible than in that of *Forsteri;* and the feet are clear yellow instead of being tinged with dusky. The mottled and variegated crown and upper parts are much the same in both; and the markings of the quills quite identical. The tail, however, differs remarkably. In *hirundo* the outer webs of all the feathers are dusky-gray. In *Forsteri* the reverse is the case. The difference is even more marked than in the adults.

There is little to be said with regard to the bibliography of this species. In 1831 Swainson and Richardson describe it, calling it *S. hirundo*, but noticing the discrepancies which exist in the tail and feet. In 1834, Nuttall seizes upon these differences in a note under *S. hirundo*, and suggests for the species the name of *S. Forsteri*, in the event of its proving distinct. The citation "*S. hirundo*, Rich., nec Linn.," is, I believe, the only synonym of this well-marked species, unless, indeed, it be necessary to refer to it the two preceding species.

I append the detailed measurements of several specimens of this species, which will serve to show within what limits it varies in size and proportions.

Cat. No.	Locality.	Sex.	Wing.	Tail length.	Depth of fork.	Bill length.	Height at base.	Tarsus.	Middle toe and claw.
24274	New Jersey.	♂	10·00	6·90	4·00	1·65	0·40	0·94	1·15
12692	" "	×	9·50	7·70	5·00	1·58	0·40	0·91	1·10
11624	" "	×	10·10	6·75	3·60	1·64	0·40	0·90	1·15
4928	Florida.	♀	10·30	5·00	2·30	1·50	0·35	0·95	1·14
.....	"	×	9·75	7·00	4·10	1·60	0·40	0·95	1·05
9973	Sac Valley.	♂	9·70	6·90	4·00	1·56	0·40	0·90	1·10
13473	Utah.	♂	9·70	7·70	4·70	1·56	0·40	0·93	1·08
.....	California.	×	10·30	7·20	3·70	1·55	0·38	0·99	1·15
4317	Louisiana.	×	10·20	6·60	3·55	1·54	0·35	0·90	1·08

STERNA HIRUNDO Linn.

Hirundo marina, Ray, Syn., p. 131.
Sterna major, Brisson, Ornithologie, p. 113.
Sterna hirundo, Linnæus, Syst. Nat., i. 1766, 227; et auct. Fab. Fabric. et Rich. exceptis.
Hydrocecropis hirundo, Boie, Isis, 1844, p. 179.
?Sterna fluviatilis, Naumann, 1820, fide Temm.
Sterna marina, Eyton, Cat. Brit. Birds, 1836, p. 55.
Sterna Wilsoni, Bonaparte, Comp. List., 1838, p. 61, et auct. Amer. recent. = *S. hirundo ex Americâ.*

"Great or Common Tern," Latham and English authors. "Hirondelle-de-

mere pierre-garin," Buffon and French authors. "Gemeine, oder Rothfüssiger Meerschwalbe," Bechstein, Meyer and German authors. "Wilson's Tern," Bonaparte, and most later American authors.

Habitat.—Sea Coasts of Europe, part of Asia and America, ascending rivers and bays to a considerable distance.

This species has been so long known that any description of its characters, or changes of plumage are unnecessary. Temminck says that the adults in winter do not lose the black of the crown, "elle est seulement plus terne." If this be so, the species forms an exception to the general rule among Terns, that at this season the front becomes nearly white, the crown variegated with black and white, or the black still further reduced to a circumocular fascia.

Comparisons of this species with *S. Forsteri* and *macroura*, its most intimate allies, will be found under the head of the former.

The common Terns of Europe and America were considered identical by all writers up to the year 1838. At that date they were separated by Bonaparte; and American authors, with the exception of Audubon, have generally followed his example. I am little pleased to be obliged to refer to a European species, an American bird which has been judged distinct by high authority, but such a procedure seems unavoidable in the present instance. I am not aware that any distinctive characters have ever been assigned to our bird. Bonaparte, in instituting the species, gives no description, as, indeed, is the case with several other species founded in the same work, with regard to which he appears to have relied, for means of separating them from their European allies, rather upon some theory of geographical distribution, than upon any discrepancies presented by the birds themselves. I have very carefully compared a series of skins from both continents, and neither in size, form or color, have I been able to detect the slightest differences; and consequently, until some one is more fortunate than myself in detecting valid specific characters, I must refer the American bird to the old Linnæan *S. hirundo*.

Below are offered the detailed measurements of five American and European birds, taken at random from a large series. It will be observed that in no respect do the dimensions of the birds from the two continents present greater differences than are found in the various examples from either.

A.—*S. hirundo ex Europâ.*

Cat. No.	Sex.	Locality.	Wing.	Tail.		Bill.		Tarsus.	Middle toe and claw.
				Outer feather.	Depth of fork.	Length.	Height at base.		
9559	♀	Europe.	10·30*	5·70	2·65	1 38	0·33	0·81	0·97
24280	♂	Holland.	9·80	5·60	2·60	1·51	1·31	0·78	0·90
21680	♂	Hungary.	10·80	6·20	2·70	1·45	0·36	0·80	0·90
23444	♀	"	10·60	5·90	2·70	1·45	0·32	0·84	0·96
23445	♂	"	10·80	6·50	3·00	1·35	0·31	0·80	0·90

B.—*S. hirundo ex Americâ.*

Cat. No.	Sex.	Locality.	Wing.	Tail.		Bill.		Tarsus.	Middle toe and claw.
				Outer feather.	Depth of fork.	Length.	Height at base.		
18224		Labrador.	11·00	6·50	3·10	1·50	0·32	0·84	0·98
22287		Massachus'tts	10·40	5·90	3·02	1·41	0·31	0·78	0·93
1149	♀	Cape May, N.J.	10·60	6·40	2·85	1·36	0·31	0·78	0·93
20811	♂	Hudson s Bay	10·40	5·90	2·85	1·50	0·32	0·78	0·95
12474	♂	Utah.	10·50	6·00	2·50	1·51	0·35	0·80	0·95

* Inches and hundredths.

For a species so long known, the present has remarkably few synonyms. That of *S. Wilsoni* is the one which has been most firmly established. I quote *S. flaviatilis* with a query on the authority of Temminck. This author, and also Degland, unhesitatingly refer it to the present species, while by some very recent authors* it is regarded as distinct. Eyton, in calling the bird *S. marina*, derives his authority for the specific name from the *Hirundo marina*, of Ray's Synopsis, p. 131. Brisson's *Sterna major* probably also refers to this species, but though both these latter names have priority over Linnæus' appellation, they are to be disregarded, as neither of their authors were binomialists.

STERNA MACROURA Naumann.

Sterna hirundo, Faber, Prod. 1822, p. 88. Fabricius, Faun. Grœnl. 1780, p. 105. Nec Linn. nec Richards.
Sterna macroura, Naum., Isis, 1819, p. 1847. Degland, Ornith. Europ. 1849, p. 344. Lawrence, Gen. Rep. Birds, 1858, p. 862.
Sterna arctica, Temm., Man. Orn. 1820, ii., 742, et auct. pleriq.
Sterna nitzschii, Kaup, Isis, 1824, p. 153, secundum Gray.
? Sterna brachytarsa, Graba, fide Gray.

DIAG.—*St.* rostro gracile, rubro; pedibus brevissimis, rubris; corpore toto cærulescente-plumbeo, subtus dilutiore; caudâ, uropygio, tectricibusque caudalibus inferioribus albis; rectrice laterali valdè elongatâ, pogonio externo griseo-fusco.

Habitat.—Europe. Atlantic Coast of North America from Massachusetts northward. Interior of Arctic America, (Hudson's Bay, Great Slave Lake.) Semiavine Straits.

Examination of a very large series of this species shows it to be subject to great variations in some respects. These are especially noticeable in the bill and tail. The largest bill in the series measures 1·40 inches along the culmen; the smallest (from Nova Scotia) only 1·08,—the difference being over ·30 of an inch. The average length of bill is about 1·30. The tail varies in length quite as remarkably, the difference between two equally adult individuals being more than 1½ inches. The color of the bill is pretty constant,—a uniform deep lake. Sometimes, however, it acquires a dusky tip, but never the decided black space which exists in *S. hirundo* and *Forsteri*. The bill is much smaller, and every way more delicately shaped than in those species. The under parts are nearly uniform in color. This is very decided, scarcely if at all lighter than the back, (very different from the slight wash of *hirundo*,) and extends in full intensity quite from the throat to the vent,—the under tail coverts being pure white, in marked contrast. The under surface of the wings do not share the general color of the body, but are pure white. The feet are exceedingly short, and hardly vary appreciably. Their color is carmine, not so deep as the bill, but still not of the vermilion or coral red of those of *hirundo*.

The distinctive features of this species and the *S. hirundo*, will be found under the head of *S. Forsteri*. They are so many, and so well marked, that it is difficult to conceive how the two species were ever confounded. The differences between it and *S. Pikei*, the next most closely allied species, are given under the head of the latter. There is no other North American species with which the present requires comparison.

I have carefully examined a large series of examples from both continents, and have been unable to detect the slightest discrepancies. This is one of the species of which, so far as I am aware, American and European specimens have never been separated by any writer.

Temminck's name of *arctica* has until recently been very generally applied to this bird; but that of Naumann must supersede it. Temminck admits that *Naumann* named the bird *macroura* before he called it *arctica*, but insists upon

* Des Murs, Traite Générale d'Oologie Ornithologique, p. 551.

the adoption of his name upon the following grounds: "Le nom de *macroura* ne convient point à ma *St. arctica;* elle a seulement une queue un peu plus longue que *St. hirundo*, tandisque nous avons en Europe et à l'étranger des Sternes à queue très longue, et que *St. Dougalli* a une queue extraordinairement longue, depassant les ailes souvent de plus de deux pouces." The fact, however, of there existing other Terns with tails as long or longer than the species to which the name *macroura* was applied, would hardly be recognized by ornithologists as a valid excuse for setting aside a prior designation. Temminck's description is very accurate, but the dimensions given, ("13 pouces 6 ou 8 lignes") is considerably below the average.

I regret that I have never seen the immature or winter plumage of this species; the more so, since, so far as I can discover, no description of these stages has been given by any American writer. They were unknown to Temminck. Degland* says that the winter plumage differs from that of summer only in the black of the crown being variegated with white. The same author describes the young before the first moult as resembling those of *S. hirundo;* but being a little smaller, the tarsus notably shorter, the bill slenderer and brown, with the base and cutting edge of the mandibles yellowish red. His description in other points does not differ materially from *S. hirundo.*

Degland also speaks of the occurrence of a hybrid of this species, and the *S. hirundo*, partaking in a varying degree of the characters of either parent. Though I have never met with a specimen which I could not unhesitatingly refer to one or the other species, it seems not at all improbable that hybrids should really occur.

The *Sterna hirundo* of the authors quoted in the synonomy undoubtedly refers to the present species. Though in the description of *S. nitzschii* of Kaup there are some discrepancies, I follow Gray in assigning it as a synonym. I have never had an opportunity of examining *S. brachytarsa* of Graba, but quote it entirely upon the authority of Gray.

STERNA PIKEI, Lawrence.

Sterna Pikei, Lawr. Ann. N. Y. Lyc. N. H., vi. 1853, 3. Id. Gen. Rep. Birds, 1858, 863. Atlas, pl. xcv.

DIAG.—(*Adultus, vestitu hyemali?*) S. rostro tenue, fuscescente-rubro; fronte albo griseoque variegato; occipite nigro; dorso alisque griseo-cœrulescentibus; uropygio albo; caudâ valde elongatâ, forficatâ, rectrice laterali pogonio externo fuscâ; corpore subtus albo; pedibus rubris.

Habitat.—Coast of California.

I have before me the type of *Sterna Pikei*, the original of Mr. Lawrence's descriptions (l. c.) obligingly furnished by that gentleman for examination. This specimen, the only one known to exist in any cabinet, is unfortunately in immature or winter plumage, and in rather poor condition. The species is a very strongly-marked one, differing widely from any other of North America, not only in colors, but in form and proportions. In size it is considerably smaller than *S. macroura*, the wing being one inch or more shorter than in the average of that species; the tarsi and toes a very little less. The bill measures 1·12 inches; it is remarkably slender, its heigth at base being only ·25 of an inch —just about equal to that of *antillarum*. The color is quite undefinable in the specimen before me, but, as remarked by Mr. Lawrence, is probably deep carmine in life. The whitish front, becoming more and more mixed with grayish black towards the occiput, together with the plumbeous lesser wing coverts, are evidently those of an immature bird, probably of its first winter. The black of the occiput is quite pure, and extends on the sides of the head far enough to embrace the eyes. The marking of the primaries and secondaries are precisely those of *S. macroura*, and the color of the back and wings is much the same.

* Ornith. Europ. 1849, ii. p. 345.

The tail is very long. I do not mean, however, that the lateral tail feathers are greatly produced, as in *macroura* and *paradisea*, (though that is not improbably the case in the summer plumage) for the depth of the fork is not greater comparatively, than in *hirundo*; but the whole tail is produced, the central feathers being absolutely as long as in *macroura*, which is a larger bird. The outer web of the lateral tail feather is very dark colored,—even more so than is that of *macroura*,—and the outer webs of the other feathers are shaded with grayish: but in the adult it is probable that the colors will be the same with those of the last-named species. A striking feature of *Pikei* is the pure white of the whole under parts, of the rump, and of the neck behind between the black pileum and the back, there being not the slightest trace of the plumbeous wash, so conspicuous in *macroura*, *hirundo*, etc. The species in this respect agrees with *S. paradisea*, and, like that species, may perhaps, during the breeding season, acquire a rosy tint on the under parts.

I regard this species as intermediate between *S. macroura* and *paradisea*, though most closely allied to the former. In the foregoing remarks the differences between the two have been pointed out. With the latter—*S. paradisea*—it agrees in several particulars: slenderness of bill, color of under parts and of feet, &c. It is at once to be distinguished by its much darker colored upper parts, different markings of primaries, pure white rump, slenderer and smaller bill and feet, greater elongation of central tail feathers, &c.

The acquisition of perfect specimens of various stages of this interesting Tern, of whose changes of plumage we can only judge by analogy, and with whose habits we are entirely unacquainted, is a particular desideratum in North American Ornithology.

STERNA PARADISEA Brünn.

Sterna paradisea, Brünnich, Orn. Bor. 1764, p. 46, and of recent authors. Lawrence, Gen. Rep. 1858; 863.
Sterna Dougalli, Montagu, Orn. Dict. Suppl. 1813, and of most authors, including Audubon and Nuttall.
Sterna Macdougalli, Macgillivray, Man. Orn. ii. p. 233.
Thalassæa Dougalli, Kaup.
Hydrocecropis Dougalli, Boie, Isis, 1844, p. 179.

DIAG.—(nupt. temp. ad.) S. rostro tenue, nigro, basin versus rubescente, pedibus rubro-aurantiis; caudâ longissimâ, valdè forficatâ, fere albidâ, remigibus omnibus internè albo-marginatis ad apices ipsas; corpore suprà perlaceo, subtus rosaceo-albo.

Habitat.—Atlantic coasts of Europe and America.

In a number of equally adult examples, I find that the color of the bill varies: in most the black extends nearly or quite to the base, in others fully the basal third of the bill is reddish. The extreme points of both mandibles are yellowish. The color of the mantle is lighter than that of any other species; the tail, exceedingly long and tapering, is of so light a pearly blue as to be almost white. A most striking feature of coloration of this species consists in the well-defined, broad white inner margins of all the primaries extending quite around the tips of the feathers, on to the outer webs on the first and second primaries. Immature and winter specimens have the bill brownish black; the front white; the crown and nape dull black, variegated with white. The lateral tail feathers want the great elongation and attenuation they acquire during the breeding season, the tail being no more deeply forked than that of *Forsteri*, or even of *hirundo*.

This species is so distinct in characters, that a comparison with any other is needless.

The American bird has never, I believe, been separated from the European. The specimens I have compared appear identical in every respect.

STERNA ANTILLARUM Coues ex Lesson.

Sterna minuta, Wilson, 1813; Bonaparte, 1828; Audubon, 1838; sed non Linnæi, 1776.

Sterna argentea, Nuttall, Man. Orn. 1834, ii. 280; sed non Princip. Maxim. quæ species Braziliensis.

Sterna frenata, Gambel, Pr. A. N. S. Ph. 1848, iv. 128.

Sternula antillarum, Lesson, Descriptions de Mammifères et d'oiseaux recemment de couverts, &c., Paris, 1847, p. 256. Adultus.

Sternula melanorhyncha, Lesson, op. et loc. cit. Juvenis.

DIAG.—*S. Sternæ minutæ* similis, ejusdemque staturæ; sed rostro breviore et valdè graciliore, vittâ frontale angustiore, dorso, uropygio, caudâque suprà concoloribus, cœrulescentibus-perlaceis.

Habitat.—Atlantic coast of North America, from Labrador to Texas, and ranging further south into the Antilles. Great lakes and rivers of interior of North America. Not on the Pacific coast?

The bill of this species, as usual in the subfamily, varies somewhat in length; but the longest bills before me do not equal the shortest of the European bird. The slenderness of the bill, which is very marked in comparison with its transatlantic congener, is constantly preserved. The black tip of the bill, usually from one and a half to two-tenths of an inch in length, is sometimes reduced to a mere point; but it is very rarely wanting altogether. The white frontal lunula varies within narrow limits, probably widening somewhat with increasing age; but it never, I believe, attains the ordinary breadth of that of the European. The neck behind, between the black pileum and the back, is a somewhat lighter shade than the latter, but the difference is scarcely noticeable. The pearl gray of the back and wings extends unchanged on the rump, upper coverts, and the inner tail feathers quite to their tips; but the outer vanes of the lateral tail feathers, and their bases, are white. As described by most authors, the two outer primaries in the great majority of adult spring birds are black, their shafts white, their inner webs broadly bordered with white, except toward the tips; but specimens frequently occur which have the three or four outer primaries of this color. This is, without doubt, merely a seasonal feature, and one quite independent of sex or age; for all the specimens bearing this character of primaries are adult birds, labelled as having been taken in July and August. At this season of the year they have finished the duties of incubation, and are about to put on the perfect winter dress, as the ragged and dilapidated condition of their plumage testifies. It is well known that allied species of Terns, such as *S. hirundo*, *Forsteri*, etc., towards the close of the summer, at the approach of the moult, entirely lose the delicate silvery hoariness with which the primaries are glossed over during the breeding season—these parts becoming of a plain, dull, brownish tint. The change in the present species is precisely analogous.

The young of the year, taken in July and August, differ greatly from the adults. The bill, though as stout at the base, is much shorter, less acute at the tip, and wants the sharply-defined angle at the symphysis. It is brownish black, the base of the under mandible dusky flesh color. The forehead is mostly white. The crown and occiput are variegated with brownish black and white, the former color mostly aggregated into a postocular patch. The back and wing coverts are lightly washed over with the pearl gray of the adults; but this color is greatly obscured, and its continuity interrupted by dark brown crescentic or hastate spots, one or more on each feather, which give the upper parts a mottled appearance. The primaries are all grayish black, growing successively lighter, and more and more glossed with silvery, from without inwards; the inner webs of all bordered with white. This white is broadest on the outer primary, but falls considerably short of the tip; it grows narrower, but at the same time longer, on the others, until on the inner ones it goes quite around the tip to the

outer web. The tail is not deeply forked, but simply emarginate, the difference being about that which attains between the adult and young of *Hirundo horreorum*. I have never seen it of quite the shape figured by Audubon; but in his plate it is very accurately colored.

This species is so very distinct from *S. minuta*, that it is a little singular that they should ever have been confounded. The following are the

Differential Diagnoses of the American and European birds.

S. minuta.—Bill along the culmen 1·20 inches, height at base ·27; width of frontal lunula ·40. Rump, upper tail coverts and tail pure white, in marked contrast to the pearl blue of the back and wings.

S. antillarum.—Bill along culmen 1·05 inches, height at base ·25; width of frontal lunula ·30. Pearl blue of upper parts continued uninterruptedly on to the rump, tail coverts and tail.

These differences are all I can discover between the two species; quite enough, however, to permanently separate them. Nuttall states that the "Silvery Tern is about 9½ to 10 inches long; the European species 8 to 8½ only." It is difficult to determine the exact length of a species from dried skins; but in this case it is certain that no such difference exists. In fact, judging from the wings and tarsi,—parts which do not change in dimensions in drying,—the two are nearly or quite identical in size; and I am sure that the difference, if any, is not greater than is found between individuals of either species. Both appear to range from eight to nine inches in length. I cannot appreciate the difference in the color of the upper parts mentioned by Nuttall.

But, while our pretty little Tern thus rejoices in unimpeachable claims to specific distinction, it has not been equally fortunate in retaining for any length of time undisputed possession of a title of its own. By the earlier writers on North American Ornithology it was confounded with the European bird, and called *Sterna minuta*, Linn. Nuttall, in 1834, was the first to vindicate its claims to specific distinction from its European analogue. This author, however, while he gives correctly enough its essential characters, commits the grave error of referring it to the Brazilian *S. argentea* of Prince Maximilian,—quite a different bird. Nuttall appears to have made the mistake in this wise. He evidently never examined a specimen of *S. argentea;* for he says, "That our bird is that of Brazil we have no further evidence than the slight notice of Temminck." Now Temminck's* remark is as follows: "Cette espèce,"—*S. minuta*,—"est absolument la même dans l'Amerique septentrionale. Les voyageurs au Brézil ont aussi trouvé dans ces contrées une petite hirondelle-de-mer modelée sur les formes de la nôtre. Mais elle forme une espèce distincte, bien caractérizée par son bec plus robuste, qui est entièrement d'un beau jaune clair; les distributions des couleurs offrent aussi quelques disparités. Le prince de Nieuweid indique cette espèce sous le nom de *Sterna argentea*. Voy. v. i. p. 67." With only this brief indication to guide him, and impressed with the different distribution of the colors of the upper parts of *S. minuta* and *antillarum*, Nuttall might readily overlook the discrepancies mentioned in the size of the bill, and in this manner refer the American bird to the Brazilian.

In the Proceedings of the Philadelphia Academy for 1848, Dr. Gambel points out the distinctive features of the present species and the *S. argentea*, and our bird being thus left without a name, he applies to it the exceedingly appropriate one of *S. frenata*, by which it has been known from that date up to the present time. I am therefore very reluctant to supersede it by any other; but the *Sternula antillarum* of Lesson undoubtedly refers to the present species, and has priority in point of date. Lesson's description (vide op. cit.) is essentially as follows: "Differs from *S. minuta* in its *shorter bill*, of orange color, tipped with black; *the white frontal band narrower*. Two outer quills bordered with

* Man. d'Orn. vol. ii. p. 753.

black: tarsi orange. Lives on the banks of the Guadaloupe." Here, it will be noticed, that though the characters are so brief, the peculiar features of bill and frontal lunula are given with such precision, that there can be no doubt of the propriety of referring the description to the species now under consideration.

Immediately following the description of the *S. antillarum*, there is instituted (l. c.) a *Sternula melanorhyncha*, Less., with substantially the following characters: "A little stouter than the preceding; differs from it and *S. minuta* in the straight and black bill. The white front of small extent. Black of head above extends to middle of neck. Black of sinciput mixed with white; lower neck white above, the gray of the upper part of the body washed with brownish. Tail short, little forked; the lateral feathers tipped with slender filaments. Tail pale grayish white, the outer quills broadly margined with brown." It is evident from almost every paragraph of this description, more particularly the mention of the black bill, the sinciput mixed with white, and the upper parts washed with brownish, that Lesson had in view an immature or winter Tern. The habitat given is the same as that of the preceding,—*antillarum*,—and I have but little doubt that the description is that of the young bird of the species now under consideration, in which the characters are almost exactly as given by Lesson. Indeed, a specimen before me agrees exactly with the description, even to the lateral tail feathers tipped with slender filaments,—said filaments being the termination of the shaft of the feather, from which the web has been worn away. I therefore quote *Sternula melanorhyncha*, Less., as a synonym of the present species.

Genus HYDROCHELIDON Boie.

Hydrochelidon, Boie, Isis, 1822, p. 563. Type *S. nigra* Linn.
Viralva, Leach, Stephen's Zool. 1826, xiii. p. 166. Same type.
Pelodes, Kaup, Sk. Ent. Eur. Thierw. 1826, 107. Type *Sterna leucopareia*, Natterer.

Ch.—Bill a little shorter than the head, longer than the middle toe and claw; very delicate, slender, acute; culmen and commissure decidedly declinato-convex, the amount of curvature increasing towards the tip; outline of rami and gonys both concave, the former most so: the angle separating them prominent and very acute. Wings exceedingly long, pointed, of same color as back, without distinct markings on either web. Tail rather short, contained $2\frac{1}{2}$ times in the wings, only moderately emarginate, (much as in *Gelochelidon*,) the lateral feathers but little exceeding the next, not tapering and acuminate; all the feathers broad and rounded. Feet slender and short; tarsi much abbreviated, rather less than the middle toe alone. Toes moderately long; the webs rather narrow, and very deeply incised. Size small, general form delicate; colors mostly black, the wings and tail plumbeous.

A genus distinguished from *Sterna* proper chiefly by its very slender attenuated bill, with its decurved tip: its short tail, of a very different shape; its deeply incised interdigital webs and its very peculiar style of coloration. Other differences, however, will be noted in the preceding diagnosis. North America contains but a single representative,—the young of which was described by Wilson as *S. plumbea*, but which is in all probability identical with the well-known European *H. fissipes*. Other closely-allied species of Europe are the *H. nigra*, (of Linnæus=*H. leucoptera* of most authors), and *H. hybrida* (of Pallas =*H. leucopareia* of most authors.)

The principal synonym of *Hydrochelidon* is *Viralva* of Leach, (1826,) based upon the same type. *Pelodes* of Kaup, 1829, founded upon *H. leucopareia*, is also strictly a synonym of *Hydrochelidon*.

Hydrochelidon fissipes G. R. Gr. ex Linn.

Sterna fissipes, Linn. Syst. Nat. i. 1766, 228. Not of Pallas.

Hydrochelidon fissipes, G. R. Gray. Gen. Birds, iii. 1849, 660.
Sterna nigra, Brisson, and of authors. Not of Linn.
Hydrochelidon nigra, Boie, Isis, 1822, p. 563.
Viralva nigra, Leach, Steph. Gen. Zool. 1826, xiii. p. 167.
Sterna nævia, Linnæus, S. N. i. 1766, 228. Young.
Sterna plumbea, Wilson, Am. Orn. vii. 1813, 83, pl. lx. Young.
Hydrochelidon plumbea, Lawrence, Gen. Rep. 1858, 864.

Habitat.—Europe. North America generally, both on the sea-coast, and in the interior.

This species in all its changes of plumage is too well known to require any descriptions.

I have critically compared quite a series of European and American specimens, in all stages of plumage, but have been entirely unable to detect the slightest discrepancies between the birds of the two continents. The specimens before me are all absolutely identical in size and relative proportions of different parts; and the colors of those of the same age correspond minutely. There do not appear to exist the slighest characters upon which to base specific distinction.

The first distinctive name applied to the American bird was *plumbea*, of Wilson, based upon the immature bird, he probably, however, not recognizing it as the young, or desiring to separate it from the European species. The birds of the two continents were first formally separated by Bonaparte, in 1838, in his Comparative List, and his example has been followed by the majority of subsequent American authors.

To G. R. Gray, I believe, is due the credit of elucidating the synonomy of this, as well as of the other species of the genus, which was in a state of great confusion. The proper name of the present species appears to be *fissipes*, Linn., the name *nigra*, Linn., usually applied to it, really referring to the white-winged black Tern of Europe, of which *leucoptera* is the most firmly established synonym. Mr. Gray has also shown that the proper name of the whiskered Tern usually given as *leucopareia* Natterer, is *hybrida* of Pallas.

Genus HALIPLANA Wagler.

Onychoprion, Wagler, Isis, 1832, p. 277. Type *S. serrata*, Forster.
Haliplana, Wagler, Isis, 1832, p. 1224. Type *S. fuliginosa*, Gm.

Ch.—Bill as long as the head, but little less than the tarsus and middle toe together, perfectly straight, stout, especially at base, where it is nearly as broad as high, tip rather acute. Culmen but very slightly convex; gonys about straight, so ascending as to make the commissure nearly straight; rami slightly convex, the prominence between them and the gonys illy developed, not acute. Nostrils somewhat more anterior than in *Sterna*, not nearly so much so as in *Anous*, in a decided, but rather irregularly-defined sulcus, which terminates a little beyond the middle of the bill in several longitudinal striæ. Outline of feathers at base of bill much as in *Sterna*. Wings exceedingly long, pointed, but the first primary scarcely surpassing the second. Tail very long, deeply forked, the feathers broader and stiffer than in *Sterna*, not so regularly tapering, but still quite acuminate at their tips. Legs rather long for this subfamily: the length chiefly apparent by a greater denudation of the tibia. Toes rather short; the middle with its claw exceeding the tarsus but slightly. Size moderate; general form slender and graceful. Bicolor.

A genus distinguished from *Sterna* by several important characters. In the shape of the bill, position of nostrils, proportions of primaries, color to some extent, there is an evident approach to *Anous*. It is, however, decidedly to be referred to the typical *Sternæ*, rather than to the *Megalopterea*.

Wagler's *Onychoprion* is based upon the *S. serrata* of Forster; while his *Haliplana* has as type *S. fuliginosa*, Gm. The former of these species—*S. serrata*—

is in all probability identical with *fuliginosa*, and is at all events strictly congeneric with it. This being the case, perhaps *Onychoprion* ought to be employed for the genus; as it is instituted several pages in advance of *Haliplana*. But, as the conflicting names are by the same author, and bear the same date, I have preferred to adopt *Haliplana*, which, besides being based upon the old and well-known type *fuliginosa*, has the merit of being much more euphonious.

HALIPLANA FULIGINOSA Wagl. ex Gm.

Sterna fuliginosa, Gml. S. N., 1788, i. 605, et auct.
Haliplana fuliginosa, Wagler, Isis, 1832, p. 1224.
Onychoprion fuliginosa, Gould, Introd. B. aust., 1848, 113.
Sterna serrata, Forster, Descrip. Anim. 1844, 276. Adult.
Onychoprion serrata, Wagler, Isis, 1832, p. 277.
Sterna oahuensis, Bloxham, Voy. Blonde, 1826, p. 251. Fide Cass.
Sterna guttata, Forster, Descript. Anim. 1844, p. 211. Juv.
Anous l'herminieri, Lesson, Descr. de Mammifères et d'oiseaux, &c., 1847, p. 255. Juv.

DIAG.—H. bicolor, corpore suprà, rostro, pedibus, remigibusque nigris; corpore subtus, fronte et rectrici laterali nisi apicem versus, albis.—(*Adultus*).

Minor; rostre graciliore; caudâ minus forficatâ; corpore toto brunnescente-nigro, subtus dilutiore, abdomine tectricibusque caudalibus inferioribus griseo-albis; tectricibus alarum latè albo-terminatis.—(*Juvenis*).

The plumage of the young of the year of this species differs so remarkably from that of the adult, that I have above contrasted the diagnoses of the two ages. While the plumage of the adult is well known, a description of that of the young may not be here out of place.

(*Young of the year.*)—The bill is much smaller and weaker than that of the adult; its upper mandible black; its lower, together with the eyes and feet, are dusky red. The whole body is a uniform brownish or fuliginous black,—this color deepening on the primaries, growing lighter on the under parts, until on the abdomen and under tail coverts it is dull grayish white. The wing coverts and scapulars are all broadly tipped with white, giving a very marked spotted appearance to the parts. The feathers of the back, rump and upper tail coverts are narrowly margined with dull rufous, which gives a transversely waved appearance to the parts. The tail is uniformly of much the color of the wings: all the feathers at their extreme tips fading into light brown.

The above description is taken from a bird in the collection of the U. S. Exploring Expedition, under Captain Wilkes, U. S. N., taken at Hendin Island. It is labelled "S. fuliginosa, Gm. juv.," by Mr. Cassin. I have carefully compared the series of adults in the same collection, and cannot find that they differ in the least from specimens from the West Indies and Southern States.

Upon the above-described state of plumage of *Haliplana fuliginosa* is based, I take it, the *Anous l'herminieri* of Lesson. ("Descriptions de Mammifères et d'oiseaux recemment decouverts," 1847, page 255.) A condensed translation of this author's description is as follows: "Length 24 cent. Bill black above, red on the lower mandible; tarsi red. Plumage uniform dusky black beneath, the lower belly and under tail coverts white, washed with gray; above blackish brown, dark and uniform on the head and neck, enammelled with transverse white spots on the greater wing coverts, and rayed with rufous on the back, rump and wing coverts." It will be seen that this description corresponds in the minutest particulars, which render it but little if at all doubtful, what bird he had under consideration. His specimens came from the Antilles near the Guadaloupe.

I have also quoted, as a synonym of the young, *S. guttata* of Forster. This author (loco citato) says: "S. caudâ forficatâ corpore fuliginoso, dorso tectricibusque albomaculatis, pedibus nigris,"—and a part of his further description is: "Corpus magnitudine circiter *Sternæ hirundinis*." . . . "Corpus

omne fuliginosum; abdomine circa anum albicante; fronte fusco-cinerea." The dimensions are given as length 14 inches; bill 1.50; tarsus and toes 2.75. This description in all respects applies very exactly to a stage of plumage a little more adult than that characterized as *Anous l'herminieri*, in which the under parts have become lighter, and there are signs of the white front.

Sterna serrata, of the same author (page 276), is to be referred to *S. fuliginosa*, provided the Pacific bird be the same as the Antilles and Florida, which we have no reason to doubt. I quote *S. oahuensis* on the authority of Mr. Cassin, not having an opportunity of consulting the reference.

Section *MEGALOPTEREÆ.*

If the preceding groups which have been considered as genera—and they are so held by the majority of modern writers—be really such, then the *Anous stolidus* is entitled to more than generic separation from the other representatives of the subfamily. The discrepancies in every particular of form, as well as of pattern of coloration, are very marked and decided. In the following diagnosis are given the characters which present themselves in the *Anous stolidus*: my want of familiarity with exotic forms preventing me from distinguishing with accuracy the features of the section from those that are strictly characteristic of its typical genus.

Genus ANOUS Leach.

Anous, Leach, Stephens' Gen. Zool. 1826, 139. Type *S. stolida*, L.
Megalopterus, Boie, Isis, 1826, 980. Same type.

Ch.—Bill greatly exceeding the tarsus, rather longer than the middle toe and claw, as long as the head, moderately robust, depressed at the base, where it is very broad (as broad as high), compressed in the rest of its extent, tapering to the rather acute, attenuated and somewhat decurved tip. Culmen about straight for half its length, regularly decurved towards the tip, rounded, and towards the base very broad and flat. Commissure about straight to near the tip, where it is regularly declinato-convex. Outline of both rami and gonys concave, former most so; the prominence which separates them being illy defined and not acute. Both mandibles marked with numerous more or less distinct longitudinal striæ; their cutting edges inflected. Nostrils situated far forwards, their anterior extremity nearly half way to the tip of the bill, in a deep sulcus formed by the rounded culmen and a prominent broad ridge which runs from the base of the upper mandible, along its cutting edge to beyond the nostrils, where it gradually becomes lost. Just above the base of this ridge there is a small but distinct triangular fossa, separated by an oblique stria from the large nasal sulcus. Outline of feathers at base of bill very peculiar; those on the culmen have a broadly convex outline, and reach considerably beyond the lateral feathers, which latter slope rapidly backwards with a slightly convex outline. This is the reverse of *Sterna*, in which the feathers reach far forwards on the sides of the upper mandible, and recede on the culmen to form an acute angle. Wings only moderately long for this subfamily, not very acute, the first primary scarcely surpassing the second; all the primaries slightly falcate, very broad almost to their rounded tips; unicolor. Tail exceedingly long, more than half the wing; rounded, the lateral feathers regularly much graduated; all the feathers broad at the base, tapering to their somewhat acuminate tips, their shafts stiffened. Tarsi moderately stout, exceedingly short, much less than the middle toe without the claw. Lateral toes very long, the inner especially, which is but little shorter than the outer. Hind toe well developed. Interdigital membranes very long and full, their margins even, unincised. Size moderate; general form stout; nearly unicolor; colors very dark.

Anous stolidus (Linn.)

Passer stultus, Ray, Syn. 154, fide Leach.

Gavia fusca, Brisson, Ornith. pl. xviii. fig. 2.
Sterna stolida, Linn., S. N. 1766, i. 227, et auct. antiq.
Anous stolidus, G. R. Gray, Gen. Birds, 1849, iii. 661, et auct. recent.
Megalopterus stolidus, Keys, et Blas., Wirb. Eur. 1840, 98.
Anous niger, Stephens, Gen. Zool. 1826, xiii. 140.

A comparison of the Floridan bird with that from the South Pacific, collected by Wilkes' Exploring Expedition, shows some differences of color, form and size, which, though not great, are well marked and quite constant in all the specimens I have examined. The bill of the Pacific bird is of the same length as that of the American, but is higher at the base, which gives it a somewhat different shape. The toes are considerably longer, while the tarsus is of just the same length; making a different relative length of tarsus and toes. The wing is from a half to three-fourths of an inch longer; the tail is very decidedly longer, the difference being quite an inch. The central tail feathers are half an inch shorter than the lateral feathers in the Pacific bird; while in the American the emargination is much less, only about a fourth of an inch. The differences in color are slight. The American bird has the occiput bluish plumbeous, which fades into pure white on the crown anteriorly; while the Pacific bird has the occiput darker, and the crown ashy white instead of pure. The sides of the head and neck all round, in the American bird, have a bluish plumbeous wash, notably different from the general fuliginous, which is entirely wanting in the Pacific bird. The feet of the American bird appear much darker in the dried skin.

Mr. Cassin, in the Ornithology of the Expedition, remarks upon these differences in the following words: "Numerous specimens from the shores and islands of the Pacific Ocean present, with some degree of uniformity, small and apparently unimportant differences from others from the Atlantic coast of North America. The bill appears to be larger in the latter, and a slight dissimilarity is observable in the colors. On careful comparison, however, we are not inclined to consider the bird of the Pacific as possessing characters sufficient to justify a distinct specific designation; but venture to suggest that further examination of specimens from localities in the two great oceans, and especially of the various immature plumages, is yet desirable."

I tabulate the differences between the two, leaving it to future investigation to determine their constancy and value.

American Bird.	*Pacific Bird.*
Length of wing 10·00 to 10·50 inches.	Length of wing 11·00 to 11·25.
Length of tail about 6·00.	Length of tail about 7·00.
Height of bill at base ·38.	Height of bill at base ·43.
Length of tarsus 1·00.	Length of tarsus 1·00 (same).
Length of middle toe and claw 1·45.	Length of middle toe and claw 1·60.
Middle toe and claw 1·45 hundredths of tarsus.	Middle toe and claw 1·60 hundredths of tarsus.
Central tail feathers but slightly shorter than the next.	Central tail feathers ·50 of an inch shorter than next.
Occiput bluish plumbeous, becoming pure white on the front. Sides of head and neck all round with a decided wash of bluish plumbeous. Feet nearly black in dried skin.	Occiput brownish ash, becoming ashy white (not pure) on the front. Sides of head and neck not notably different from general fuliginous. Feet reddish brown in dried skin.

The difference in color appears very slight. I attach more importance to the discrepancies in size and proportions. If the Pacific bird be really distinct from the American, it has probably yet to receive a name; for it is very different from the various species of *Anous* mostly described by Mr. Gould. In that event, it may be called a ANOUS FRATER.

In the preceding pages are noticed all the Terns which are known to inhabit

North America. The fact of the writer's being actively engaged in professional duties at a Military Hospital while committing to paper the results of his investigations, will be a sufficient excuse for any evidences of hasty composition which may be apparent.

Catalogue of the MIOCENE SHELLS of the Atlantic Slope.

BY T. A. CONRAD.

In the Miocene or Upper Tertiary formation of the Atlantic Slope there have been collected about five hundred and eighty species of shells,—two hundred and seventy-two of which are Conchifera and three hundred and nine Gasteropoda. The most northern limit of this formation appears to be in Gloucester County, New Jersey, and it underlies the eastern portions of Delaware, Maryland, Virginia, North and South Carolina. I have included in the Miocene formation that portion of the South Carolina Tertiary referred to the Pliocene period by Tuomey and Holmes, because I can discover no line of demarcation by which these tertiary strata can be divided into two distinct groups. The extinct species common to South Carolina and the more Northern States are numerous, and the fauna can only be regarded as that of one geological era. Some few of the species described by Tuomey and Holmes from the South Carolina Tertiary occur also in New Jersey, at the most northern boundary of the Miocene. The per centage of recent species in South Carolina, it appears to me, should be greatly reduced,—and I would reject from the list as many as eighteen, consisting of the following shells: Busycon canaliculatum, B. perversum, Strephona literata, Littorina irrorata, Natica canrena, Dolium galea, Fasciolaria gigantea, F. distans, Pholas costata, P. oblongata, Petricola pholadiformis, Solen ensis, Lucina divaricata, L. Pennsylvanica, Cardium magnum, Mactra similis, Yoldia limatula, Strigilla fluxuosa. It may be that all the species are extinct, but I have not had an opportunity of comparing all those doubtful shells with the recent forms. Natica heros and N. duplicata, *Say*, have fossil analogues in Maryland so closely resembling them that I find no essential difference; but the shells of this doubtful character are not more than thirty in number out of five hundred and eighty-one species. Near the coast, a Post-Pliocene or Pleistocene formation rests immediately on the Miocene, replete with existing forms, but as a group resembling that of more Southern latitudes on the coast of the United States. There is no intermingling of extinct species between these two formations, and the passage is almost as abrupt as between the Eocene and Miocene.

The final subsidence of the Eocene appears to have been accompanied by such an alteration of climate or other conditions as to have given origin to a totally distinct terrestrial and marine fauna, the latter existing on an Eocene and Cretaceous bed, extending from New Jersey to South Carolina inclusive, and which appears to have been generally extinct and above the sea during the existence of the European Pliocene faunas.

Works referred to.

C. Miocene Foss. Conrad, Medial Tertiary or Miocene Fossils of the U. S.

C. Foss. Shells of Tert. Form. Conrad, Fossil Shells of the Tertiary Formations of the United States. 1832.

Trans. Amer. Philos. Soc. Transactions of the American Philosophical Society of Philadelphia, vol. ix. n. s. 1845; vol. vi. n. s. 1839.

Sillim. Journ. American Journal of Science and Arts.

Journ. A. N. S. Journal of the Academy of Natural Sciences of Philadelphia.

Proceed. A. N. S. Proceedings ditto.

Plioc. Foss. S. C. Pliocene Fossils of South Carolina.
Bullet. Nat. Inst. Bulletin of the National Institution.
Emmons, Geol. N. C. Geology of North Carolina.

MURICIDÆ.

MUREX, Lin.

M. globosus, Emmons, Geol. N. C. 247, 105*a*.

Subgenus PTERORYTIS, Conrad.

Fusiform; six prominent recurved foliated ribs; aperture ovate; channel closed.

M. umbrifer, C. Tert. Foss. 17, 3, 1. Emmons, Geol. N. C. 247, 104*a*.
M. sexcostata, Emmons, Geol. N. C. 248, 106.

TYPHIS, Montfort.

T. acuticosta, C. Journ. A. N. S. vi. 217, 9, 1. 1829.

TROPHON, Mont.

T. (Fusus) tetricus, C. Tert. Foss. 18, 3, 6. Foss. Med. Tert. pl. 46, fig. 4.

FUSINÆ.

FUSUS.

Subgenus SCALASPIRA, Conrad.

Fusus strumosus, C. Tert. Foss. 18, 3, 4. Foss. Med. Tert. pl. 49, fig. 3.

NEPTUNEA, Bolten.

N. (Fusus) devexa, C. Foss. Med. Tert. pl. 49, fig. 8. Proceed. A. N. S. i. 309.
N. (Fusus) exilis, C. Tert. Foss. 17, 3, 2. Mioc. Foss. pl. 49, fig. 1. Tuomey and Holmes, Plioc. Foss. S. C. 150, 30, 5. Emmons, Geol. N. C. 251, 111*a*?
N. (Fusus) equalis, Emmons, Geol. N. C 251, 11.
N. (Fusus) filosa, C. Proceed. A. N. S. 1863.
N. (Fusus) lamellosa, Emmons, Geol. N. C. 251. 112.
N. (Fusus) parilis, C. Tert. Foss. 18, 4, 2. Foss. Med. Tert. pl. 49, fig. 5.
N. (Fusus) rustica, C. Tert. Foss. 18, 4, 1.
Fusus errans, C. Journ. A. N. S. vi. 223.
N. (Fusus) trossula, C. Tert. Foss. 18, 3, 5. Foss. Med. Tert. pl. 46, fig. 6.

FASCIOLARIIDÆ.

BUSYCON, Bolten.

B. alveatum, C. Proceed. A. N. S. 1862, 583.
B. adversarium, C. Proceed. 1863.
B. perversum, Tuomey and Holmes, (not Lam.,) Plioc. Foss. S. C. 145, 29, 3.
B. carinatum, C. Proc. A. N. S. 1862, 286.
B. (Pyrula) carica? Tuomey and Holmes, Plioc. Foss. S. C. 145, 29, 1.
B. (Fulgur) contrarium, C. Sill. Journ. xxxix. 387. Miocene Foss. pl. 45, f. 11.
B. perversum, Emmons, (not Lam.,) Geol. N. C. 249, 107.
B. (Fulgur) coronatum, C. Bullet. Nat. Inst. 187. Mioc. Foss. pl. 46, f. 1.
Pyrula canaliculata, Lyell, (not Lam.,) Man. Geol. 172, 151.
B. canaliferum, C.
Busycon canaliculatum, Tuomey and Holmes, (not Lam.,) Plioc. Foss. S. C. 145, 29, 2.
B. Carolinensis, Emmons, Geol. N. C. 249, 108.
B. (Cassidulus) Carolinense, Tuomey and Holmes, Plioc. Foss. S. C. 147, 30, 1.
B. (Pyrula) excavatum, C. Sill. Journ. xxxix. 387. Miocene Foss. pl. 45, f. 12.
Cassidulus Carolinensis? Tuomey and Holmes, Plioc. Foss. S. C. 147, 30, 1.
B. filosum, C. Proceed. A. N. S. 1862, 286.

[Dec.

to the genus *Latrunculus* of Gray, or *Eburna* of others.* The shell structure appears to be more compact than in the typical *Vivipari*, and the species generally are more ponderous. The angulation of the outer lip and the sinus at the base are characteristic, and contrast strongly with the uniform plane of the aperture of *Viviparus*.

The figure of a "deformed" *V. decisa* (36) published by Binney, gives an exaggerated idea of this peculiarity of form.

The soft parts of *Melantho* appear to also differ from those of *Viviparus*, the rostrum being smaller and less protractile, and the auricles behind the tentacles are likewise much smaller.

The earliest known American species of *Melantho* were contemporaneous with the *Vivipari*, three species having been discovered by Dr. Hayden in the lignite beds of Fort Union and described by Meek and Hayden as *Vivipara multilineata* (=*V. nebrascensis* M. and H.), *V. vetusta* and *Melania* or *Lymnæa multistriata*. These have now been referred to the genus *Melantho* in the manuscript work of Meek and Hayden.

Melantho multilineatus.
" vetustus.
" multistriatus.

The following are referrible to the same genus,—*Melantho:*

Melantho ponderosa *Ad. ex Say* = V. ponderosa *B.*
" decisa *Ad. ex Say* = V. decisa *B.*
" coarctata *Gill ex Lea* = V. coarctata *B.*
" cyclostomatiformis *Gill ex Lea* = V. cyclostomatiformis *B.*
" incrassata *Ad. ex Lea* = V. incrassata *B.*
" decapitata *Gill ex Anth.* = V. decapitata *B.*
" regularis *Gill ex Lea* = V. regularis *B.*

LIOPLAX Troschel.

Lioplax *Troschel*, Gebiss der Schnecken, p. 100, 1857.
Haldemania *Tryon*, Proc. Acad. of Nat. Sciences, 1862, p. 451.
Paludina sp. auct.
Vivipara sp. auct.

Shell imperforate or rimate, turreted, rather thick; of very compact structure; unprovided with colored bands; whorls carinated and longitudinally flattened, with the sides nearly parallel. Aperture little oblique, oblong-oval, broadly rounded at the base, and sinuous or retreating backwards, the sharp outer *lip* being subangulated near the front; columellar lip concave appressed to the body whorl, forming an obtuse angle with the outer.

Operculum corneous, with a large spiral nucleus, but with the subsequent accretions concentric.

This type is evidently most nearly related to *Melantho*, but differs especially in the spiral nucleus of the operculum, as well as in the form of the aperture. A single species is found, which has been ascertained to inhabit some of the streams of Ohio, Indiana, Kentucky, Pennsylvania and New Jersey. We are indebted for its subgeneric distinction to Prof. Troschel and Mr. Tryon.

Lioplax subcarinata = Haldemania subcarinata = Vivipara subcarinata *B. ex Say.*

NOTE.—I regret that I have not been able to avail myself more fully of the invaluable "Gebiss der Schnecken" of Dr. Troschel. The four parts were only received at the Smithsonian Institution, through the kindness of Prof. Agassiz,

* The name of *Latrunculus* has been recently applied by Dr. Günther to a genus of Gobioid fishes, but, if no other reasons, cannot be retained on account of preoccupation of the name. The genus had, however, previously received the name of *Aphya* from Risso.

the day before the reception of the proof of the foregoing paper, and consequently too late to compare my views with those of the distinguished author. I am happy to find that the validity of the groups of Viviparidæ, which have been above defined, is confirmed by the researches of Dr. Troschel, who has examined the dentition of several species of true *Viviparus*, besides that of the *Paludina subcarinata* of Say, for which he has proposed the name *Lioplax*. The latter name is now substituted for *Haldemania* of Tryon, and is modified to form the name of a group containing that genus and Melantho.

Additional Remarks on the North America ÆGIOTHI.

BY ELLIOTT COUES, A. M., M. D.

Since the publication in the Proceedings of the Academy for November, 1861, of my Monograph of the genus, the Smithsonian has been constantly in the receipt of additional specimens from all parts of North America. These were mostly the *A. linarius;* but collections from the North have usually contained a number of well-characterized examples of *A. exilipes*. Nothing, however, of special importance has been elucidated, until the reception of a series collected in winter in the vicinity of Quebec. These specimens, as they throw much light on the variations of the typical species of the genus, *A. linarius*, will merit a brief notice. If the deductions I have drawn from these specimens are warrantable, we have in North America the forms long recognized in Europe as *A. Holbölli* and *A. rufescens;* and these are both rather races than distinct species.

Selecting from the series two or three skins which differ most markedly from the usual style of *linarius*, and comparing them with a typical specimen of the latter from Philadelphia, I find the following differences:

The bird is very decidedly larger. The difference in total length is nearly one inch, as near as I can judge from the dried skins. The wings and tail are each about a fourth of an inch longer. The tarsus and middle toe with its claw are together about two-tenths of an inch longer.* The bill and feet are decidedly larger and stouter, though perhaps not disproportionately so. The former is somewhat elongated; its lateral outlines straight instead of a little concave; its culmen slightly curved. The bill is of a bright chrome-yellow, except just along the culmen and at the extreme tip. The gular spot seems rather large. In other respects, the two birds are quite identical, for, with these differences in size, there is an exactly proportionate increase in the bill, feet, wings and tail; and the colors of the two do not differ appreciably, except in the bill, and perhaps the larger gular spot. The specimens give the idea, in fact, of overgrown individuals of the common *linarius*.

But now, on examining in detail the rest of the series, I find that, from the one extreme, the characters of which have just been given, there is a complete and gradual transition,—a diminution in size, down to specimens which cannot possibly be distinguished from typical *linarius*. There is no break in the series: no dividing point where we can stop calling the specimens "*linarius*" to give them another name; in spite of the discrepancy which is so evident between the two extremes.

The point of interest which attaches to these specimens, is the bearing they may have on the mooted question of the claims of *Ægiothus Holbölli* to full specific rank. As was the case at the time of the preparation of my Monograph, I have never examined a specimen which professed, upon good European authority, to be that species. Careful examination, however, of the

* The tarsus, middle toe and claw together, of the specimens under consideration, measure absolutely 1·20 inches; the same parts in *linarius* are about one inch: in *exilipes* ·80 of an inch.

figures and diagnoses of the various authors who have treated of this bird has shown that there are assigned to *Ægiothus Holbölli*, as distinctive characters, exactly those differences from the *linarius* which exist in the specimens under consideration,—viz.: larger size, larger, more elongated and bright yellow bill, and larger gular spot. I think there can be no reasonable doubt that these specimens represent in North America the form long recognized in Europe under the name of *Ægiothus Holbölli*.

If this be the case, next comes the question, what rank are we to accord to this form. Is it to be looked upon as an accidental variation from the type,—as a well marked variety,—or as a distinct species? Brehm was the first to proclaim it as distinct, and give it a name. Temminck, Schlegel, Bonaparte, and other authors,—who are rather more orthodox in their ideas of a species than is Brehm,—have always inclined, more or less decidedly, to the opinion that it is rather a race or subspecies of *A. linarius*. The fact of there being a complete gradation towards the *linarius*, has not escaped attention, and has been a powerful argument against according to it full specific rank. For my own part, though unable to demonstrate the point incontrovertibly, I am inclined to reiterate still more strongly the doubts expressed in my Monograph, as to the propriety of separating it from the *linarius*.

Pursuing this question of the variations which *A. linarius* presents, we find another species,—*A. rufescens*,—which has never been able to fully vindicate its claims to specific distinction. First introduced by Vieillot, its existence was strenuously denied by Temminck, doubtfully regarded by Bonaparte and Schlegel, and admitted by Cabanis and others. I have always entertained strong doubts as to its validity. The characters assigned are slight enough; and that they exhibit a gradation towards *A. linarius*, is admitted even by those who contend for its separation from that species. In examining two hundred or more specimens, I find many individuals, fully as small, in fact, and with as much of a reddish tinge, as specimens from Europe labelled "*rufescens*" by good authority.

The existence, then, in North America of these two races, or species, which ever they may be, the one larger and the other smaller than the typical *linarius*, may be considered as exceedingly probable, if the fact be not actually demonstrable. As a sort of negative argument, I may remark, that one might naturally look for their occurrence in this country as the typical *linarius* from Europe is absolutely identical with our own.

Ægiothus rufescens and *A. Holbölli*, compared with *A. exilipes*, afford a good illustration of the limits between which a species may vary from its normal type; while another species, looking at first glance more like this type than do either of its extremes, is permanently distinct.

I have no reason to change any of the views expressed with regard to three new species I have introduced. Additional specimens confirm the position assumed, especially regarding *A. exilipes*. I may here, however, correct a typographical error, which gives the date of the first introduction of *A. fuscescens* as "Aug., 1860," instead of "Aug., 1861."

isés que ne sont ni de vraies plantes, ni de vrais animaux. Ce n'est qu'à force d'observations et de méditations que l'on pourra distinguer clairement les vraies plantes et les vrais animaux des autres êtres organisés qui en diffèrent assez pour avoir une autre détermination et un autre rang dans la division méthodique des productions de la nature." (Séances des Ecoles Normales, tome v. p. 277.)

We cite these authors only for the general purpose of illustrating the usual style of the suggestions and opinions frequently to be met with. Purposely, at present, we do not extend extracts of this description, nor give any such from living authors.

On the LESTRIS RICHARDSONI of Swainson; with a Critical Review of the Subfamily LESTRIDINÆ.

BY ELLIOTT COUES, M.D., U. S. A.

In the year 1831, a Jäger was described and figured in the Fauna Boreali-Americana, under the name of "*Lestris Richardsoni* Swains." This bird has been generally supposed to be the true *parasitica* of Brünnich, in the now well known *fusco-unicolor* state of plumage which all the species of *Stercorarius* pass through in arriving at maturity. Consequently, the name "*Richardsoni*" has been employed for the common Jäger, especially by American writers, to the exclusion of the prior name "*parasitica*," of Brünnich.

Examination of the works of Temminck, who, at the time in which he wrote, probably knew more about Jägers than almost any author, will show how this misapplication of a name became general.

In his edition of 1820, he is acquainted with but a single species of *Lestris*, (besides *catarractes* and *pomarinus*,) which he calls "*parasitica* Brünn." His description of the latter is made up of a mixture of the characters of *parasitica* and *Buffoni*; and the synonyms of the two are indiscriminately adduced.

In his edition of 1840, he recognizes the distinctions between the two species *parasitica* and *Buffoni*; but, unfortunately, he calls the true *parasitica* "*Richardsoni*," adducing the proper synonyms of the species under that name; while he describes the true *Buffoni* under the name of "*parasitica*." He is thus fully aware of his mistake of 1820; for (page 498) he makes the following "*Remarque*: Comme notre article du stercoraire parasite ou labbe du manuel p. 796, renferme, ainsi qu'il vient d'être dit, les synonymes de deux espèces distinctes, (le stercoraïre à filets subulés courts, et le stercoraire à longs filets,) il est necessaire de refaire en totalité toutes les indications sur ces deux espèces."

But, believing Swainson's bird to be the same as the *parasitica*, he says (page 492), in defence of the nomenclature adopted: "Shortly after the publication of the second edition of the Manual, of 1820, we became aware of the error in our article on *Lestris parasitica*, where the description and synonymy of two distinct species are confounded. Guided by Boie's observations, we had applied the name *parasitica* to the small Jäger with short tail feathers, proposing to adopt for the one with long tail feathers (the labbe à longe queue of Buffon,) the name *Buffoni*; but since some English authors,* led into error by our article, have thought that they have discovered in our *parasitica* a new species, which they call "*Richardsoni*," we are obliged to adopt their mistake, sanctioned as it is by several naturalists, and in many collections. Being, then, confident that *Lestris Richardsoni* is really the same with our *L. parasitica*, with short tail feathers, . . . we adopt here the first of these names for the short-tailed Jäger, leaving to the long-tailed species

* i. e., Swainson, and others.

the appellation of *parasitica;* for we take it, names and priority of discovery are not of the last importance; all that is necessary is to be understood when we talk of species; and for this purpose, a name sanctioned by usage, and which does not cause confusion, is far better than one which has nothing to recommend it but its priority of date."

It was by this somewhat heterodox reasoning on the subject of nomenclature, that Temminck adopted for the common Jäger the name of "*Richardsoni*," and turned over the name "*parasitica*" to the long-tailed species. His example has been very generally followed, as will be seen by consulting the synonyms given in this paper. I am inclined to the opinion, however, that Swainson's bird may be a distinct species from the old *parasitica* of Brünnich, upon the following grounds:

In the very extensive series of Jägers in the Museum of the Smithsonian Institution, there are several specimens which agree among themselves in the possession of some characters which differ considerably from those of the typical *parasitica*. The whole bird is considerably larger,—the difference in the wing from the flexure amounting to nearly or quite an inch, and proportionate discrepancies existing in the tarsi and toes. The bill is longer, (though not stouter;) its nail longer compared with the ceral portion, and its convexity more gradual. The most marked features, however, lie in the tail. While the relative proportions of the lateral feathers to the central pair are much as in *parasitica*, the whole tail is longer, more graduated, and the individual feathers somewhat broader. From the insertion to the tips of the pair of feathers next the central, measures in *parasitica* about 5½ inches; in "*Richardsoni*" about 6½. A proportionate difference exists in the absolute total length of the central pair; though their relative lengths do not differ appreciably. The tail of the specimens under consideration is more graduated,—the amount of graduation being nearly an inch, instead of about half an inch, as in *parasitica*. The central pair seem broader than in *parasitica*, and somewhat of a different shape; and the same may be said, though less markedly, of the lateral feathers. Comparing some of these specimens which are in the dusky stage with the corresponding state of plumage of *parasitica*, I find the dusky to be much darker,—in fact, quite of a blackish rather than of a fuliginous hue. No other differences are appreciable.

These specimens agree minutely with the plate and description of what Swainson called "*Richardsoni*," so that there cannot be the slightest doubt of the propriety of referring them to that species. The only question is, are the differences above detailed sufficient to constitute specific distinctions?

Bonaparte, in his Conspectus, ii. page 209, gives a form or variety of *parasitica* thus: "*α. L. coprotheres* Brünn.; *Richardsoni* Swains. . . ex bor. Eur. et Am. Omni tempore et ætate obscurè unicolor." Swainson's figure also represents the bird in this *fusco-unicolor* stage; he perhaps thinking that this feature formed a distinctive character. This, however, cannot be the case; and I wish to be distinctly understood as throwing this out of consideration altogether in discussing the claims of the bird to specific distinction, since it is now certain that this dusky stage is merely an evidence of immaturity; and that the bird, when adult, will have the white neck all round, and white underparts, exactly as in *parasitica*. If it is to be separated at all, this is to be done upon the grounds of the differences in size and proportion above detailed,—without the least reference to the dusky stage of plumage in which it is figured by Swainson.

While I am not thoroughly satisfied of the entire propriety of so doing, I shall, in the following Review of the subfamily, separate it specifically from the *parasitica;* desiring to call attention to it, as at least a well-marked form, not a dist inct species.

[May,

General Considerations.

Before proceeding to speak in detail of the individual species of the *Lestridinæ*, I desire to make a few remarks on the points which at the present day must be taken more especially into consideration, in carrying on an investigation of this subfamily of birds.

Although the contrary was formerly the case, yet at the present time the species of Jägers are pretty definitely ascertained,—being better known, in fact, than the species either of *Larinæ* or *Sterninæ*. This arises partly from the fact of the small number of existing species, and partly because most of the species present really very marked differences, which can hardly be overlooked by any one examining specimens with an ordinary degree of mental acumen. With the amount of knowledge which we possess at present, it would be quite impossible to mistake *Buffoni* for *parasiticus*, etc., in whatever stages of plumage they may be found; and therefore, except in one or two instances, I have thought it quite unnecessary to present any lengthy description or specific characters, for the purpose of separating one species from another. In a paper like the present, such points seem quite uncalled for.

At the same time, there is a point concerning which authors are even now at variance, and which seems to have need of all the light that can be thrown upon it. I refer to the remarkable changes of plumage which the species of one of the genera of this subfamily,—*Stercorarius*,—undergo in arriving at maturity, and more particularly that perplexing state in which the bird is uniformly dusky. From the time when Brünnich, in 1764, institutes a *Catharacta* "*coprotheres*, corpore toto fusco," etc., and then adds: "An a præcedenti sexu vel specie diversa? A quibusdam hæc pro fœmina, illa §127 (*parasitica*) pro mare habetur,"—the question has been an open one. Some authors have made a distinct species of this stage; others have given it as a variety; others still have considered this plumage indicative of age, or of season, or of sex. Modern opinions have generally agreed in considering it as simply an evidence of immaturity, and not a variety, much less a distinct species. I hope I shall be able to show in the following pages, that this latter opinion is the correct one, even if I cannot prove exactly *what* age the dusky stage is characteristic of, or whether more than one sex participates in it. To this end, I have gone into detail regarding the various ages of two of the species,—*pomarinus* and *parasiticus*.

But there is still another point in the study of the Jägers, which, being a matter of more than ordinary difficulty, demands our most patient and careful investigation. This is the *bibliography* of the subfamily. Many of the species were known to the very earliest,—even pre-Linnæan,—writers on ornithology; and, as a natural consequence, the synonymy of the various species is as intricate, and in as puzzling a state of complication, as perhaps that of any other group of birds, rendering it a peculiarly difficult task to unravel the various knotty points which present themselves for our consideration. Fortunately, however, the synonymy of most of the species is rather intricate, than doubtful; rendering it possible, perhaps, to present a tolerably accurate list of references, by careful and patient study. To this part of the subject in hand I have paid special attention, and it is believed that the lists of synonyms given are pretty full, and include all the important references. Others must judge of the accuracy of the citations, each according to his own views of the subject.

If I seem to have made any uncalled for innovations in nomenclature, I can only offer as an apology, that it is impossible to conduct an investigation into the bibliography of the subfamily without seeing that many of the names in common employ must be superseded, provided we are to pay any attention to recognized laws of nomenclature.

Family *LARIDÆ*.

Subfamily LESTRIDINÆ.

Of this, the first subfamily of the *Laridæ*, there are at present known to exist eight species, belonging to two genera. Of these, five inhabit the northern, and three the southern hemisphere. The five northern species are all represented in North America. The following analytical table will represent the characters of the species and genera sufficiently well for our present purposes. The diagnoses are purposely made as brief as possible, only the most prominent features being noticed.

§ *Analytical Table of the Genera and Species of the Lestridinæ.*

I. Staturâ maximi, et formâ robustissimi. Pedes et rostrum validi. Tarsus brevior quam digitus medius cum ungue. Rectrices mediæ latæ vix ultrà cæteras porrectæ.....Genus BUPHAGUS.
  a. Rostri longitudo poll. 2, et ultrà; altitudo ·75. Ad anguli oris 3·00 poll. Ex maria arctica..... *B. skua.*
  b. Rostrum brevius, crassius. Ex maria antarctica..... *B. antarcticus.*

II. Staturâ minores, et formâ graciliores. Pedes et rostrum graciles. Tarsus non brevior quam digitus medius cum ungue. Cauda longior, et rectrices mediæ valdè ultrà cæteras porrectæ.....Genus STERCORARIUS.
  1. Tarsi posticè asperrimi. Rectrices mediæ latæ in apices ipsas.
    a. Rectrices mediæ cæteris 4 pollices longiores..... *S. pomarinus.*
  2. Tarsi posticè subasperi. Rectrices mediæ longæ, rigidæ, acuminatæ.
    a. Rectrices mediæ cæteris 4 poll. longiores..... *S. parasiticus.*
    b. Similis *S. parasitico;* sed major, caudâ totâ longiore, plus rotundata..... *S. Richardsoni.*
    c. Similis *S. pirasitico;* sed minor, rostro magis compresso, rectricibus mediis elongatis, apicibus rotundatis (Bp.)..... *S. Hardyi.*
    d. Similis *S. parasitico*. Sed etiam minor *S. Buffono;* rectricibus mediis lineari-acutis, rachide denudata rigida, pollice et ultrá cæteras superantibus (Bp.)..... *S. spinicauda.*
  3. Tarsi posticè subasperis. Rectrices mediæ longissimæ, flexibiles, filiformes.
    a. Rectrices mediæ cæteris 8 ad 10 pollices longiores....*S. Buffoni.*

Genus BUPHAGUS Moehring.

Buphagus, Moehring, Genera Avium, 1752, page 66, No. 71. Typus *Larus catarractes*, Linn.

Stercorarius, "Brisson," Vieillot, Nouv. Dict. d'Hist. Nat., 1817, 153. Typus idem. (Sed non verus *Stercorarius*, Briss. cujus typus *Larus parasiticus*, L. est.) Gray, Genera of Birds, 1849, 651. Degland, Ornith. Europ. 1849, ii. 287. Bonaparte, Conspectus Avium, 1856, 206. Lawrence, Gen. Rep. Birds N. A. 1858, 838; et aliorum auctorum.

Catharacta, Brünnich, Orn. Bor. 1764, 32. Typus *Cath. skua* Brünn. Bonaparte, Comparative List, 1838.

Larus, (partim) Linnæus, Systema Naturæ, 1766. Gmelin, Systema, Naturæ, 1788. Latham, Index Ornithologicus, 1790. Meyer et Wolf, Taschenbuch deutsch. 1810.

Catarractes, Pallas, Zoog. Rosso-As. 1811, ii. 308. Typus *C. skua*. Stephens, Shaw's Gen. Zool. xiii. 1825, 214.

Lestris, "Illiger," Temminck, Man. Orn. 1820—40. Typus *L. catarractes*. (Sed non verus *Lestris* Ill. cujus typus *L. parasitica* L. est.) Faber,

Prodromus Isl. Orn. 1822. Lesson, Traité d'Ornith. 1831. Keyserling et Blasius, Wirbelth. Europ. 1840; et auctorum aliorum.

Megalestris, Bonaparte, Conspectus Avium, 1856, p. 206. Typus *Larus cataractes*, Linn.

1. Buphagus skua Coues ex Brünnich.

"*Skua Hojeri*, Ray, Synopsis Avium, 128."

Larus fuscus, Brisson, Ornithologie, vi. 1760, p. 165. "Scopoli, Bemerk. Natur-Gesch. 1770, 90."

Catharacta skua, Brünnich, Ornithologia Borealis, 1764, 33. No. 125.

Catarracta skua, Retzius, Fauna Suecica, 1800, 161, No. 123. Bonaparte, Cat. Met. Ucc. Europ. 1842, 79. Bonaparte, Rev. Crit. Degland's Ornith. Europ. 1850, 202.

Catarractes skua, Pallas, Zoographia Rosso-Asiæ, ii. 1811, 309. Stephens, Shaw's Gen. Zool. 1825, xiii. 215.

Cataractes skua, Macgillivray, Man. Orn. ii. 1842, 255.

Catarractes vulgaris, Fleming. (fide Bp.)

Catarractes fusca, Leach. (fide Bp.)

Lestris skua, Brehm. (fide Bp.)

Larus catarractes, Linnæus, Systema Naturæ, i. 1776. Gmelin, Systema Naturæ, i. 1788, 603. Latham, Index Ornithologicus, ii. 1790, 818.

Larus keeask, Latham, Index Ornithologicus, ii, 1790, 818.

Lestris catarractes, Illiger, Prodromus, 1811, 273. Faber, Prodromus Island. Ornith. 1822, 102. Temminck, Manuel d'Ornith. ii. 1820, 792. Temminck, Manuel d'Ornith. iv. 1840, 494. Bonaparte, Synopsis, 1826, No. 304. Nuttall, Man. Ornith. ii. 1834, 312. Schlegel, Rev. Crit. Ois. Eur. 1844, 84.

Lestris catharactes, Brehm, Naturg. Europ. Vög. 1823, 739.

Lestris catharractes, Schinz, Europ. Fauna, 1840, i. 387.

Lestris catarrhactes, Kaup, Sk. Ent. Europ. Thierw. 1829, 64. Keyserling et Blasius, Wirbelth. Europ. 1840, i. 239.

Stercorarius catarrhactes, Vieillot, Nouv. Dict. d'H. N. 1817, xxxii. 154. Vieillot, Fauna Franç. 1828, 385. Degland, Orn. Europ. 1849, ii. 289. Gray, Genera Avium, iii. 1849, 652.

Stercorarius catarractes, Bonaparte, Consp. Avium, 1836, ii. 206. Lawrence, General Report Birds N. A. 1858, 838.

Stercorarius cataractes, Selys-Longchamps, Fauna Belg. 1842, 155.

Stercorarius catharractes, Des Murs, Traité d'Ool. Ornith. 1860, 551.

Stercorarius pomarinus, Vieillot, Galerie d'Ois. ii. 1834, 220; sed non Temm. nec auctorum!

Sp. ch.—Above blackish brown, more or less variegated with chestnut and whitish; each feather being dark-colored, with a spot of chestnut towards its extremity, which in turn fades into whitish along the shaft towards the tip of each feather. On the latero-nuchal region, and across the throat, the chestnut lightens into a decided reddish yellow, the white being as a well-defined, narrow, longitudinal streak on each feather. The crown, post-ocular and mental region have but little whitish. Inferiorly, the plumage is of a blended fusco-rufous, lighter than on the dorsum, with a peculiar indefinite plumbeous nuance. The wings and tail are blackish; their rhachides white, except towards the apices; the remiges and rectrices white for some distance from the bases. This white on the tail is entirely concealed by the long tail-coverts, but appears on the outer primaries as a conspicuous spot. The bill and claws are blackish horn; the feet pure black.

Bill from base to tip 2·10; to end of cere 1·20; gape 3·00; height at base ·75; width a little less; rami 1·60; gonys ·50; wing 16·00; tail 6·00; tarsus 2·70; middle toe and claw 3·10.

Habitat.—Seas and sea coasts of the northern hemisphere; more particularly in higher latitudes.

It is quite unnecessary here to go into any details regarding the specific characters of so long and well known a species, and one which is so very distinct both in form and colors from any other of our continent.

I am well aware that the adoption of the name under which I present this species, may be looked upon by many ornithologists as an unnecessary, or at least as an uncalled for innovation. In defence of the nomenclature adopted, I beg leave to offer the following considerations, which, it is hoped, will exonerate me from the charge of needlessly changing names, by proving that if we are to pay any attention to recognized rules of nomenclature, such a procedure is unavoidable in the present instance, and that no other name than the one adopted can be used:

In the first place, Moehring's genus *Buphagus* is certainly based upon a bird which was afterwards the *Larus catarractes* of Linnæus. His diagnosis (vide infra*) unmistakably refers to one of the *Lestridinæ*, while the species is fortunately exactly fixed by his reference to "*Hojeri*" and "*cataractes.*" Perhaps no one of his diagnoses is more definite than this one. This being the case, the only question is, are his genera to be adopted and used in ornithology?

I believe that the rule generally followed regarding Moehring's genera, is that they are to be adopted when they can be certainly identified, provided that they do not conflict with subsequent Linnæan appellations. Upon this principle, many of Moehring's old genera have been revived and adopted by Gray, and his example has been followed by Baird, and other ornithological writers. It is thus that such genera as *Philomachus*, *Collyrio*, *Trogon*, *Uria*, *Catarractes*, etc., have taken the precedence over more modern appellations, to which their priority entitles them. The rule, however, does not appear to have been so strictly carried out as it should be, if adhered to at all. Gray, for example, adopts *Stercorarius* of Brisson for the Jäger, remarking "that it is supposed to be *Buphagus* of Moehring." His procedure in this case is a little remarkable, since *Buphagus* is certainly identifiable; and there is no Linnæan genus with which it can conflict,—Linnæus ranging all the Jägers known to him with the gulls, under *Larus*. With this restriction, which, it must be confessed, is rather a compliment to Linnæus, than strict justice to other writers, the genera of Moehring are to be adopted when identifiable. The fact of that author not being a binomalist,—in fact, not dealing at all with species,—does not appear to be a valid reason why his genera should be neglected any more than those of Brisson for example. I am decidedly in favor of the adoption for any genus of the first appellation that is proposed for it after the date of the first published works of Linnæus, provided there be no conflict between them: considering the introduction of a definite form of nomenclature as beginning with that illustrious writer.

Now, supposing that we do reject Moehring's *Buphagus*, let us see what will be the consequence. "*Stercorarius* Brisson 1760" is the name which of late has been most generally applied to the genus in question. But the type of Brisson's genus is not the *catarrhactes*,† but the true *parasitica*, as is evident by his elaborate description, although no specific name is given; and hence, if it is to be used at all, it must be for the genus of which *parasitica* is typical. But Brisson was a polynomalist; and if we refuse to adopt Moehring's names on this score, Brisson's genera must also be rejected: to which procedure, of course, no naturalist would assent.

Catharacta of Brünnich of 1764 comes next in order, and has as its type

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* *Moehring, Genera Avium*, 1752, page 66, No. 71. "*Rostrum* postice rectum, membrana callosa ad nares usque tectum, versus apicem incurvum, lateribus compressis. *Femora* extra abdomen. Digiti antici tres membrana intermedia toti cohærentes, posticus liber."

† Brisson, on page 105 of vol. vi. of his Ornithologie, ranges this species under *Larus*, calling it "Le Goelaud brun, *Larus fuscus.*"

C. skua, which is the true *catarrhactes*. But here he is anticipated by Moehring, who had previously applied the name *Cataractes** to a genus of Guillemots, of which *Uria troile* is the type. This genus has been adopted for the latter birds, by Cassin, Bryant, and others; and, unless we admit the different spellings of the same word as distinct genera, which would seem quite unwarrantable, Brünnich's name must be superseded.

Lestris of Illiger (1811) being based upon the *parasitica*, I am aware of no other genera than the above, which were founded on the *Larus catarrhactes* down to 1856, when Bonaparte, in his Conspectus, proposed the name *Megalestris*. The choice then lies between Moehring's *Buphagus* and Bonaparte's *Megalestris;* and of the two, I prefer to take the former, especially as by so doing we shall be enabled to retain *Stercorarius* of Brisson for the other species of the subfamily.

Regarding the adoption of the specific name *skua*, I will merely remark that as Brünnich was as strict a binomalist as Linnæus himself, there is no reason why his specific names should not be employed in all cases when they are identifiable. The date of Brünnich's "*skua*" is 1764; that of Linnæus' "*catarractes*" is 1766.

It is a little surprising that Brisson, after instituting the genus *Stercorarius* for the Jägers, should be so far at fault regarding the proper affinities of the present species as to place it among the Gulls, under the name of *Larus fuscus*. His descriptions of all the Jägers are remarkably accurate, and so full and complete as to admit of the positive identification of all his names. In this case, and in numberless other instances, there is cause for exceeding regret that he was a polynomalist; for, had he been a strict binomalist, so that we could adopt his specific names, we should be saved a vast deal of uncertainty and profitless discussion as to the proper specific appellations to be employed.

The *Larus keeask* of Latham is certainly the present species. That author gives 22 inches as the total length, and 3 inches as the length of the bill,—dimensions which will apply to no species of *Stercorarius;* and there is no other *Buphagus* than the present inhabiting the northern hemisphere. His bird "habitat in America ad sinum Hudsonis."

The plate which Vieillot gives in his Galerie des Oiseaux, (1854) of his *Stercorarius pomarinus*, represents undoubtedly the present species; and is, so far as I am aware, the only instance of the application of the name *pomarinus* to any other species than that to which it rightfully belongs. This error seems the more surprising, since Vieillot, in 1817 and in 1828 (vide synon.), gives the species as *Stercorarius catarrhactes*.

The other synonyms of the species do not require special notice. I have endeavored to preserve the various spellings of the word *catarrhactes* by the different authors cited. I quote *Catarractes fusca* Leach, and *vulgaris* Fleming, and *Lestris skua* Brehm, on the authority of Bonaparte.

2. Buphagus antarcticus Coues ex Lesson.

Lestris catarractes, Quoy et Gaimard, Voy. Uranie, Ois. p. 38. Nec auct.
Lestris antarcticus, Lesson, Traité d'Orn. 1831, p. 606.
Stercorarius antarcticus, Bonaparte, Consp. Av. 1856, p. 207.

Diag.—B. *Buph. skuæ* similis; sed rostro crassiore et breviore.
Habitat.—Antarctic Ocean.

* This word affords a good illustration of the very various cacography we often find in the names of the old authors. Thus, we have *cataracta*, *cataractes*, *catharacta*, *catarracta*, *catarractes*, *catarrhactes*, &c. The orthography of the word will be evident if we regard its etymology. It is from κατα, and ῥηγνυμι, whence καταῤῥακτης, "a robber or despoiler;" the latinization of which is *catarrhactes*,—the *h* being derived from the rough aspirate over the second ρ. Brünnich's spelling of the word might perhaps lead us to suppose it derived from καθαιρω, "to cleanse or purify:" but this is evidently not the case,—the latinization of the word formed from the latter root giving us *cathartes*, Illiger's genus of American vultures.

This species is very closely related to the preceding, if it be really distinct from it. The fine series in the Museum of the Smithsonian Institution, procured by the United States Exploring Expedition under Com. Wilkes, all differ from the *skua* of Europe and America in the possession of shorter, and comparatively stouter and deeper bills, with more obtuse tips. These are the only points of discrepancy I have been able to detect in the examination of the series; but they appear to be quite constant.

Among the series is a specimen much larger than the rest, and than the *skua* from Europe. The bill is nearly two and a third inches long, and very stout; the wings an inch, and the tarsus a third of an inch longer than the average of European skins. It is evidently a very old individual, and the chestnut and whitish have almost entirely disappeared from both the upper and under parts, leaving the whole bird deep blackish-brown above, and a somewhat lighter brown, or fuliginous, below. The specimen is referred to in Cassin's List of the Birds of the Exploring Expedition, as "*Lestris* ——?" Although the general appearance of the bird is really different from that of the rest of the series, I do not think that the differences presented are anything more than indicative of the great age of the specimen. A collection of American and European Jägers, obligingly furnished by Mr. D. G. Elliott for examination, contains a specimen of the true *skua* from the Atlantic Ocean, which presents a very similar condition of things. The size is greater than that of any other of the series of specimens, and the colors are nearly as uniform as in the antarctic specimen referred to. I think it more than probable that the birds of this genus continue to grow in size and proportions with increasing age, and that the colors have a tendency to become darker and more uniform under the same circumstances.

Genus STERCORARIUS Brisson.

Stercorarius, Brisson, Ornithologia, 1760, vi. (Typus *Larus parasiticus*, Linn.) et auctorum pleriq.
Catharacta (partim), Brünnich, Ornith. Borealis, 1764.
Larus (partim), Linnæus, Systema Naturæ, 1766. Gmelin, Systema Naturæ, 1788. Latham, Index Ornithologicus, 1790. Meyer et Wolf, Taschenb. Deutsch, 1810.
Lestris, Illiger, Prodromus, 1811, p. 272. (Typus *Larus parasiticus*, Linn.) Et auctorum.
Prædatrix, Vieillot, Analyse, 1816, p. 62.
Labbus, Rafinesque, 1816, fide Bp.
Coprotheres, Reichenbach, 1850.

A single genus cannot, without great latitude and looseness of definition, be made to include all the species of this subfamily. The differences between *Buphagus skua* (with its southern representative *antarcticus*) and the other known species, are very great, and strongly pronounced, if we regard stature, proportions, character of central tail feathers, changes of plumage, &c. The differences fully warrant the distribution of the species of the subfamily into two genera, which may be thus defined:

Buphagus.—Bill shorter than the middle toe without the claw; exceedingly robust; width at base about equal to the height, which is a third of the length of culmen. Striæ and sulci numerous and well marked. Encroachment of feathers on bill moderate; and nearly the same on both mandibles. Occiput scarcely crested. Wings only moderately long for this subfamily,—the primaries very broad, and rounded at their tips. Tail very short, broad, nearly even, the feathers truncated; central pair projecting but little, and broad to their very tips, which are also truncated. Feet large and stout; tarsi shorter than the middle toe and claw. Size large; form robust and heavy; general organization very powerful. Colors much the same over the whole body;

not subject to any great variations with age, sex, or season. Species, *B. skua* (type) and *B. antarcticus*.

STERCORARIUS.—Bill equal to middle toe without the claw, moderately robust, height at base more than a third of culmen; striæ and sulci fewer and more slightly marked. Encroachment of feathers on bill very great, especially on the upper mandible, where it greatly exceeds that on the lower, and is of a different outline from that of *Buphagus*. Occiput decidedly subcrested. Wings exceedingly long, the primaries narrow, tapering, with quite acute tips. Tail long; the lateral feathers more or less graduated; the central pair considerably, sometimes excessively, elongated, tapering and filamentous. Feet rather slender, the tarsi equal to, or slightly longer than the middle toe and claw. Size moderate or small. Form less robust, general organization much less powerful. Nearly bicolor when adult; passing through very various states of plumage before arriving at maturity. Species, *S. pomarinus*, *parasiticus*, (type) *Richardsoni*, *Hardyi*, *spinicauda*, *Buffoni*.

Of these, the five last are very strictly congeneric in every particular. *Pomarinus*, by its larger size, somewhat more powerful form, shorter and broader central tail feathers, &c., shows a slight aberration towards *Buphagus*. But in all other features the essential characters of *Stercorarius* are so strongly pronounced, that it cannot afford a link by which the two genera may be united.

? STERCORARIUS POMARINUS Vieill. ex Temm.

Larus parasiticus, Meyer et Wolf, Tasch. Deutsch. ii. 1810, 490. (Sed non Linn. nec auct.)

Larus crepidatus, Gmelin, Systema Naturæ, i. 1788, 602. Latham, Index Ornithologicus, 1790, ii. 819. (Citat *Sterc. striatum*, Briss.)

Stercorarius striatus, Brisson, Ornith. vi. 1760, 152, pl. 13, fig. 2. (Juvenis.)

Lestris striatus, Eyton, British Birds, 18—, 53.

Lestris pomarinus, Temminck, Man. Orn. ii. 1820, 793. Temminck, Man. Orn. iv. 1840, 495. Faber, Prodromus Island. Ornith. 1822, 104. Brehm, Naturg. Europ. Vögel, 1823, 741. Bonaparte, Synopsis, 1826, No. 305. Lesson, Manuel Ornith. 1828, ii.388. Kaup, Sk. Ent. Europ. Theirw. 1829, 64. Swainson et Richardson, F. B. A. 1831, ii. 429. Nuttall, Manual Ornith. ii. 1834, 315. Audubon, Ornith. Biograph. 1839, iii. p. 396. Audubon, Synopsis, 1839, 332. Audubon, Birds America, 1844, vii. 186, pl. 451. Keyserling et Blasius, Wirbelth. Europ. 1840, i. 240. Schinz, Europ. Fauna, 1840, i. 388. Schlegel, Rev. Crit. Ois. Europ. 1844, 84. Bonaparte, Cat. Met. Ucc. Eur. 1842, 80. Bonaparte, Rev. Crit. Degland's Orn. Eur. 1850, 202. Thompson, Nat. Hist. Ireland, iii. 1851, 392. Bonaparte, Conspectus Avium, ii. 1856. 207. Des Murs, Traité d'Oologie Ornith. 1860, 551.

Stercorarius pomarinus, Vieillot, Nouv. Dict. d'H. N. xxxii. 1819, 158. Vieillot, Fauna Franç. 1828, 387. Selys-longchamps, Fauna Belg. 1842, 155. Degland, Ornith. Europ. 1849, ii 291. Gray, Genera Birds, 1849, iii. 652. Lawrence, General Report Birds N. A. 1858, 838. Coues, Proc. Acad. Nat. Sc., Philada., 1861, p. 243.

Cataractes pomarinus, Stephens, Shaw's Gen. Zool. 1825, xiii. 216, pl. 24. Macgillivray, Man. Brit. Orn., ii. 1842, 256.

Coprotheres pomarinus, Reichenbach, Syst. Av. 1850, 52, pl. 328–9.

Catarractes parasita, var. *camtschatica*, Pallas, Zoograph. Rosso-Asiæ, 1811, ii. 312.

Habitat.—Seas and sea coasts of Europe, Asia and North America. Interior of Arctic America.

I will notice the stages of plumage of this species, from that of the fully adult to that of the young of the year. Having a very extensive series at command, I have endeavored to *trace* one stage from another, and point out

exactly how the great changes of plumage to which the bird is subject, are produced.

Adult.—Bill horn, deepening into black; feet black. Pileum and occipital crest brownish-black; this color extending much below the eyes, and occupying the feathers on the ramus of the inferior maxilla. Acuminate feathers of the neck light yellow. Back, wings, tail, upper wing coverts, under tail coverts as far as the flanks, deep blackish-brown. Under parts, from chin to abdomen, and neck all round, (except the yellow acuminate feathers,) *pure white.*

The above is the plumage of the fully adult bird, and is comparatively not often met with. A more usual state of plumage (described by Lawrence and figured by Audubon* as "fully adult,") is as follows:

Nearly adult.—Generally as in the preceding, but with a row of brown spots across the breast; the sides under the wings transversely barred with white and brown; the purity of the dark color of the abdomen interrupted by some touches of white. The legs still wholly black, and the tail feathers projecting as much as in the fully adult.

Now, as a somewhat younger stage than the preceding, we have the following

Intermediate stage, (No. 1275.)—The band of dark spots across the breast has widened and enlarged, so that the whole breast appears brown, mottled with white; the sides under the wings are conspicuously barred with white and brown; the white of the under parts is continued down over the abdomen to the under tail coverts; the pure brown of these parts which obtains in the adult, now only appearing as transverse bars among the white. The upper tail coverts and some of the wing coverts are barred with white. The bases of the primaries are inferiorly white. The central tail feathers now only project an inch. The tarsi are quite changed in color; they are now irregularly blotched with chrome yellow,—the hind toe and nail being of this color.

The above changes are very gradual, and readily identifiable; the *quo modo* of their production may be thus summed up: In the adult the white and brown occupy distinct and well-marked regions; and the two colors are separated by trenchant lines of division. The younger the bird, the more this distinctness of definition of colors is lost,—the white invading and barring the brown, and the brown invading and mottling the white, wherever the two join. Then also the feet lose their black, and are variegated with yellow.

Besides the above, we find a state characterizable thus:

Dusky stage.—The bird is very nearly *unicolor:* blackish-brown all over; this color deepening into quite black on the pileum; lightening into fuliginous brown on the abdomen, with a slight gilding of the black on the sides of the neck. The whitish bases of the primaries exist. The feet are in the chromo-variegated condition. The central tail feathers scarcely project half an inch.

In the last edition of the Manuel d'Ornithologie, Temminck corrects various errors committed in previous editions, and gives, as his mature opinion, four "varieties" of this species. By examining his diagnoses, it will be seen at a glance that his "variety C" is the fully adult plumage above characterized; of which he says truly that it is "assez rare." His "B" is our second stage; his "A" is about our third stage; while his "D" is the fusco-unicolor stage just given. In his earlier editions he maintains that this dusky stage is absolutely independent of sex; but latterly he says that it is possible that the dusky birds are females; the white-bellied ones males. Ornithologists maintain very diverse views on this subject; but I believe it is generally supposed that this state of plumage is not indicative of either sex, but simply of immaturity.

Now I think that the four plumages which Temminck describes as adults

* I have Audubon's original specimen before me. It agrees minutely with his plate; and is also the specimen from which Lawrence's description in the General Report was taken.

(varieties A, &c.) are really the progressive stages of the same individuals. I do not think that even the dusky stage constitutes a distinct "variety," (*i.e.*, the birds remaining in that state all through their lives;) much less the other stages. I am of opinion that every Jäger, before arriving at full maturity, passes through each of these states: beginning with a rufo-rayed plumage—to be presently described—passing from that next into the dusky; and then assuming successively the other stages above characterized. The only question is this: What age, sex, or season is this dusky stage characteristic of? I think that it comes in next after the very young rufo-rayed plumage, for this reason. We find these dusky birds to be generally less robust than the others; with weaker bills, less elongated central tail feathers, and parti-colored tarsi. Now it is well known, that the younger the bird, the smaller it is, the shorter are the central tail feathers, and the more yellow the tarsi. Another argument, by analogy, is that the *S. parasiticus* is found in exactly the same unicolor state; and from a great number of species it can be proved, I think, that in that species it supervenes directly from the rufo-rayed plumage. [See remarks under *L. parasitica.*]

The following is the plumage of birds of the year:

Young of Year.—Bill much smaller and weaker than in the adult, light colored to beyond the nostrils, when it becomes brownish-black. Feet and toes mostly bright yellow, the terminal portions of the latter black. The whole body is everywhere transversely waved with dull rufous. On the head, neck and under parts this rufous forms the predominating color; and the bands are exceedingly numerous, of about the same width as the intervening dark color. On the flanks and under tail coverts the bars become wider, and almost white in color. On the back and wing coverts the brownish black is the predominating color; and if any rufous is present, it is merely as a narrow edging to the feathers. The under wing coverts have irregularly-angular transverse waves of brownish black and white. The remiges and rectrices are brownish black, darker at their tips; fading into whitish towards the bases of their inner vanes. On the head and neck the light rufous decidedly predominates, and seems indistinctly but thickly nebulated with dusky; this dusky forming a conspicuous spot just at the anterior canthus of the eye. (In this plumage the bird is the *Stercorarius striatus* of Brisson and the *Larus crepidatus* of Gmelin and Latham.)

There can be no doubt that the *Stercorarius striatus* of Brisson, and the *Larus crepidatus* of Gmelin and Latham, refer to this species in the very immature state of plumage just described; when the bird is considerably smaller than when adult, and is wholly rayed with rufous and dusky, with white spaces at the bases of the wing and tail feathers. The *Stercorarius crepidatus* of Vieillot, (1817.) however, is the true *parasitica*, as is also the *Lestris crepidata*, of Degland, 1838, and of Schinz, 1840. The *Lestris crepidata* of Brehm (1823) is the young of the *Buffoni*. (Vide synonyms of these species.)

Latham in his Index, page 819, gives a "*Larus crepidatus* var. *β*," which is of course also to be referred to the young *pomarinus*.

The *Larus parasiticus* of Meyer and Wolf is, I believe, the only instance of the application of that specific name to this species. The other synonyms of the species do not require any special notice, as they are quite plain and uncomplicated.

By most authors the *Catharacta cepphus* of Brünnich is considered as referring to the long-tailed species. I must confess, however, that I can hardly discover grounds for such an identification of this name; and am rather inclined to the opinion that his *cepphus* is based upon the young *pomarinus*; as are the *crepidata* of Gmelin and Latham, and the *striatus* of Brisson. Let us look at the description for a moment. It is evident, from almost every paragraph of it, that he had in view a young bird of the year,—in the state

when they are transversely rayed with dusky and rufous,—paler on the abdomen, and have the bases of the quills and rectrices white. The only point is to determine of what species it is the young. Regarding its size, Brünnich compares it with his *Catharacta skua*, saying, that it is much smaller than that species, and "Magnitudo *parasiticæ*." The young of the year of *pomarinus* is more nearly of the size of an adult of *parasitica*, than is the young of the year of the long-tailed species. The description of the colors, form, &c., which follows, agrees precisely with those of the young *pomarinus;* and when we remember that at that date the differences between the common and long-tailed Jägers were not recognized, the two species being confounded together by authors generally, (except Brisson;) it does not appear by any means certain that Brünnich had the long-tailed species in view in drawing up the description of "*cepphus*." Had that been the case, he would probably have compared it with *parasitica* rather than with *skua*. Moreover, Latham, in his description of his *Larus crepidatus*, which is the young *pomarinus*, gives "*cepphus*, Brünn." as a synonym of that species.

Upon the whole, therefore, while I by no means insist upon the reference of the name under consideration to the *pomarinus*, I merely wish to show that it very possibly belongs to it: and that the description is too vague and uncertain to justify the use of the name for either of the species. It is for this reason that I have adopted Boie's name "*Buffoni*" for the long-tailed Jäger.

Having always professed a rigid adherence to the great law of priority in questions of nomenclature, I am, perhaps, in the present instance, rendering myself liable to be taken to task for not employing the name "*crepidatus*" of Gmelin and Latham (1788–90) for this species instead of *pomarinus* of Temminck, since the former name is in all probability based upon this species. The description is, however, short and unsatisfactory, and is, moreover, based upon the young bird of the year; and, though there cannot really be much doubt as to the species which these authors had in their minds in preparing their descriptions, still I think in view of the above considerations, that it will hardly be expedient to supersede so definite, long-known and universally employed a name as *pomarinus*. At the same time, should any one else see fit to do so, I would in future writings unhesitatingly follow his example.

4. Stercorarius parasiticus Gray ex Brünn.

?Sterna rectricibus duabus internis longissimis, Linn., Fn. Suec., No. 129.
?Larus rectricibus duabus internis longissimis, Linn., S. N., 1748.
Catharacta parasitica, Brünnich, Ornith. Borealis, 1764, 37.
Larus parasiticus, Linnæus, Syst. Nat., 1766, i. 226. Gmelin, Syst. Nat., 1788, i. 601. (Num Lath.? qui me judice potius ad longicaudatum Briss spectat.)
Cataracta parasitica, Retzius,* Fauna Suecica, 1800, 160.
Catarractes parasita, Pallas, Zoog. Rosso-Asiæ, ii. 1811, 310.
Lestris parasita, Keyserling et Blasius, Wirbelth. Europ., 1840, i. 240. Schlegel, Rev. Crit. Ois. Eur., 1844, 85. Bonaparte, Cat. Met. Ucc. Europ., 1842, 80. Des Murs, Traité d'Oologie Ornith., 1860, 551. Bonaparte, Rev. Crit. Degland's Orn. Eur., 1850, 202.

* It is difficult, perhaps impossible, to say whether the citations of the authors before 1800 really refer to this species, or to the long-tailed Jäger. I have, however, placed them under the head of *parasitica*, for this reason: Retzius in his edition of the Fauna Suecica (of 1800) gives them as synonyms of his *parasitica*, of which his description is, "*Rectrices* 6, 6, (i.e., the central pair) cæteris 4 poll. longiores;" thus clearly referring to the true *parasitica*. Descriptions of previous authors had mostly been merely "*Rectricibus mediis longissimis*," whence the uncertainty. Retzius, however, is in error in adducing *Stercorarius longicaudatus*, Briss., as a synonym of *parasitica*.

Lestris parasitica, Illiger, Prodromus, 1811, 273. Temminck,* Man. Ornith., 1820, ii. 796, (duæ species confusæ sunt.) Faber, Prodromus Island. Orn., 1822, 105, (Nonne duæ species confusæ ?) Brehm. Naturg. Europ. Vög., 1823, 744. Kaup, Sk. Ent. Eur. Thierw., 1829, 47. Lesson, Traité d'Ornith., 1831. 616. Schinz, Europ. Fauna, 1840, i. 390. Bonaparte, Conspectus Avium., 1856, ii. 208.

Lestris Richardsonii, ("Swains.") Temminck, Man. Orn., iv. 1840, 499. (Sed non Swains. quæ potius species distincta.) Nuttall, Man. Ornith., ii. 1834, 319. Audubon, Ornith. Biograph., iii. p. 503; Audubon, Synopsis, 1839, 332. Audubon, Birds America, 1844, vii. 190, pl. 452. Giraud, Birds L. I., 1844, 367. Schinz, Europ. Fauna, 1840, i. 392. Thompson, Nat. Hist. Ireland, 1851, iii. 394.

Cataractes Richardsoni, Macgillivray, Man. Orn., ii. 1842, 257.

Catharacta coprotheres, Brünnich, Orn. Borealis, 1764, 38, No. 138. In ætate fusco-unicolore.)

Lestris coprotheres, Des Murs, Traité d'Oologie Ornith., 1860, 551.

Lestris parasitica var. *coprotheres*, Bonaparte, Consp. Av., 1856, ii. 209.

Stercorarius ———, Brisson, Ornith., vi. 1760, (nomen specificum nullum.)

Stercorarius crepidatus, Vieillot, Nouv. Dict. d'H. N., xxxii. 1819, 155. (Sed non *Larus crepidatus*, Gmel., Lath., qui potius juvenis *Lestris pomarinus*, Temm.)

Stercorarius cepphus, ("Leach,") Swains. et Richardson, F. B. A., ii. 1831, p. 432. Stephens, Shaw's Gen. Zool., 1825, xiii. 211, pl. 23. Degland, Ornith. Europ., 1849, ii. 295, (nec auct.)

Stercorarius parasiticus, Selys-Longchamps, Fauna Belg., 1842, 155. Gray, Genera Birds, iii. 1849, 652. Lawrence, Gen. Rep. Birds N. A., 1858, 839. Coues, Proc. Acad. Nat. Sci. Philada., 1861, p. 243.

Lestris crepidata, Degland, "Mem. Soc. Roy. de Lille, 1838, 108." Juvenis. Schinz, Europ. Fauna, 1840, i. 390. Juvenis.

Habitat.—Coast of America and Europe, more particularly in higher latitudes. Interior of Arctic America.

Pursuing the question of the general "theory of variation" in this genus, it may be well to examine closely the various stages of this its typical species. The exceedingly rich series in the Smithsonian collection enables me to trace it through all its variations.

Young of the Year in August.—Size considerably less than that of the adult, form every way more delicate. Wings more than an inch shorter; bill and feet much slenderer and weaker. Bill in some specimens light bluish horn, in others greenish olive, the terminal portion brownish black. Tarsi and greater part of the toes yellow. The bird is every where rayed and barred with rufous and brownish black. On the head and neck the rufous is of a very light ochraceous tinge, and is by far the predominating color; the dark only appearing as a delicate line along the shaft of each feather. There is an aggregation of the brown into a spot at the anterior canthus of the eye. Proceeding down the neck to the back, the longitudinal lines become larger, and gradually spread wider and wider, until between the shoulders they occupy the whole of each feather, except a narrow border of rufous; which latter is of a deeper tint than on the head. Passing down the throat to the breast, the rufous becomes decidedly lighter,—almost whitish,—while the brown, which on the throat exists only as a light longitudinal line, changes on each feather to transverse bars of about equal width with the light rufous bars with which it alternates. This pattern prevails over the whole under

* This is a combination of *parasitica* and *Buffoni*, as shown by the description and indiscriminate citation of synonyms. This error Temminck corrects in his edition of 1840, (pp. 493, 499, 500,) where he recognizes the two species and describes them accurately: but unfortunately calls the *parasitica*, "*Richardsoni*," and the *Buffoni*, "*parasitica*."

parts,—the transverse bands being broadest on the flanks and under tail and wing coverts, narrowest in the middle of the belly. The primaries are brownish black, narrowly tipped with rufous, their shafts yellowish, their inner webs fading basally into white. The tail has the same coloration as the wings. The central feathers project about three-fourths of an inch.

As the bird above described grows older, the bill and feet become stouter, the cere better developed; while the rufous everywhere gives way to the darker color. No special stage can be characterized, however, until the rufous is far outweighed by the dusky. Then we have—

(No. 18652).—Size and general proportions nearly those of the adult. Bill and cere perfectly formed; feet mostly black, but with some yellow blotches. The upper parts are unadulterated with any rufous bars; the deep brownish-black pileum has appeared, and the sides of the neck have obtained their yellow nuance, which contrasts conspicuously with the fuliginous background. Evidences of immaturity, however, are found on the under parts, where the dark color is mixed with illy-defined transverse bars of ochraceous. Rufous is also found at the bend of the wing, and on the under wing and tail coverts. The primaries are still whitish baso-externally, as are also the rectrices. The central rectrices project 2½ inches, and have the tapering form of those of the adults.

By the disappearance of the little rufous mentioned above, we have arrived at a very marked and decided stage,—viz:

(No. 20362).—With the size and proportions of the adult. Wholly deep dusky; darker and more plumbeous superiorly; lighter, and with a fuliginous tinge inferiorly; the pileum quite black; the latero-nuchal yellow, well pronounced; the remiges and rectrices quite black; feet black.

Having reached this perfect dusky stage, we will go back again to the young plumage first characterized, and show how specimens occasionally seem to proceed at once towards the adult condition with the white under parts. For example—

(No. 2754).—The juvenility of the specimen is attested by its small size, delicate bill and feet, little projection of the central rectrices, general mollipilose condition of plumage, &c. The rufous of the very young bird, instead of giving way everywhere to dusky, yields to this color only on the upper parts and crown; on the sides of the head, neck, and the whole under parts, whitish being the predominating color,—the continuity of this last being interrupted by indistinctly marked dusky bars. The yellow of the sides of the neck has not yet appeared. There is the same white space on the bases of the wings and tail as exists on the very young. The central tail feathers only project about 1½ inches.

By an attentive consideration of the preceding facts, it will be evident that we have found the same very young plumage to change gradually through one series of specimens into the fusco-unicolor state; through another series into a stage which tends to pass directly into the normal plumage of the fully adult bird, without going through this dusky epoch. What can we deduce from this perplexing fact? Does one *sex* assume this dusky plumage at a certain age, and the other not? Does this dusky state constitute the normal adult plumage of one sex? Is it a *seasonal* feature, which both sexes return to at certain periods in each year?—or, finally, does it constitute a purely accidental, but constant *variety?* Authors of weight are divided on each of these points.

I reject entirely the last hypothesis,—viz: that some birds attain to this dusky stage and retain it during their lives, though they may have sprung from normally colored parents, and have normally colored progeny. Whatever age or season, or whichever sex this state of plumage indicates, I think there can be no reasonable doubt that it is a normal and constant stage which every individual of one (or both?) sexes passes through or attains to, in its

progress towards maturity. The only question is, what age is to be assigned to this dusky state, and whether one or both sexes participate in it.

Leaving now speculation for facts, we have yet to notice the mature bird. Taking either the dusky state (No. 20362,) or No. 2754, we find that both tend to produce the following plumage:

Nearly mature, (No. 20144.)—Size and form of the adult. Pileum and latero-nuchal region, and whole upper parts, as in the adult. The under parts white (as in the adult), but clouded everywhere with dusky patches, most marked across the breast, on the sides, the flanks, and under tail coverts, and leaving the middle of the belly and throat nearly pure. Varying degrees of this dusky nubilation approach in some specimens nearly to the uniform dusky above characterized; in others fade almost into the pure white of the adult, —connecting the two ages perfectly and uninterruptedly. The tarsi of those specimens most dusky have small yellow blotches; the others not.

Now, by the complete obliteration of these dusky cloudings on the throat, breast and belly, and its increased intensity on the under tail coverts and abdomen as far as the flanks, we arrive at last at the

Adult, perfect plumage, (No. 16802).—Bill a little shorter than the head or tarsus, about equal to middle toe without the claw; stout, about as high as broad at the base. Cere longer than the nail. Culmen broad and flattened, with a longitudinal groove on each side. Nostrils as in the other species. Curvature of culmen and tomia very gradual. Gonys short, about straight; rami very long, a little concave; eminentia symphysis little marked. Striæ and sulci as in the other species. Tarsi about as long as the middle toe and claw, moderately stout, somewhat roughened supero-posteriorly, but not nearly as much so as in *pomarinus*. Scutellation and reticulation of tarsi, toes, and interdigital membranes as in the other species. Tail moderately long, slightly graduated, the lateral feathers broad quite to their apices, which are somewhat truncated, the shaft slightly protruding as a small mucro; the central pair projecting three to four inches; rigid; not losing much of their breadth until about four inches from their ends, when they commence to converge regularly to a quite acute apex. They have nothing of the filamentous character of those of *Buffoni*. Wings long, powerful, their rhachides rigid, their apices somewhat acute. Pileum, occipital crest, whole upper parts, deep brownish black, with a somewhat slaty tinge, and a slight but appreciable metallic nuance; this color deepening into quite black on the wings and tail. Rhachides of primaries and rectrices whitish, except at their tips; the inner vanes albescent baso-internally. Chin, throat, sides of head, neck all round and under parts to the vent, pure white; the feathers of the latero-nuchal region rigid, acuminate, with disconnected fibrillæ, light yellow. Under tail coverts like the upper parts, but somewhat of a fuliginous tint; the line of demarcation from the white of the abdomen very trenchant.

Dimensions of fully adult.—Bill above 1·40 inches; height or width at base, about ·50. Wing, from flexure, 13·00: tarsus, or middle toe and claw, 1·80; tail 5½, its centre feathers nearly 9·00.

Dimensions of young of year.—Bill above 1·30; height or width at base ·40; wing 12·00; tarsi, or middle toe and claw, 1·70; tail 5·00; central tail feathers not quite 6·00.

STERCORARIUS RICHARDSONI Coues ex Swainson.

Lestris Richardsoni, Swainson, Fauna Boreali-America, 1831, ii. p. 433, pl. lxxiii. sed non auctorum.

Habitat.—Interior of Arctic America.

DIAG.—S. *Stercorario parasitico* similis; sed major, rostro, tarsis, alisque longioribus; caudâ magis productâ et rotundatâ, rectricibus latioribus.

This species is treated of at length in the beginning of the present paper.

6. Stercorarius Hardyi Coues ex Bonap.

Lestris Hardyi, Bonaparte, Comptes Rendus Acad. Sciences, 1856, p. 20. Tab. Longip. species 5. Bonaparte, Conspectus Avium., ii. 1856, 210.

Diag.—"Similis *Lestrido parasiticæ;* sed minor, et rostro magis compresso; rectricibus elongatis mediis apice rotundatis."—(Bp.)

Habitat.—Southern oceans, between Philippine and Sandwich islands.

I am only acquainted with this species through the notices of Bonaparte, above cited. The diagnosis is copied from the Conspectus Avium. The species is evidently very closely related to the *parasitica*, if it be really distinct from it.

7. Stercorarius spinicauda Coues ex Hardy.

Lestris spinicauda, "Hardy." Bonaparte, Comptes Rendus Ac. Sciences, 1855. Bonaparte, Conspectus Avium, 1856, ii. 210.

Diag.—"Similis *L. Hardyi* et *parasitico;* sed etiam minor *Lestrido ceppho;* cauda truncata; rectricibus mediis lineari-acutis, rachide denudata, rigida, pollice et ultra cæteras superantibus; rostro brevi, robusto."—(Bp.)

Habitat.—Coast of Africa, near St. Helena.

A species with which, like the *S. Hardyi*, I am autoptically unacquainted. If, however, the above characters really obtain, they would seem abundantly sufficient to distinguish it. The diagnosis is copied from Bonaparte.

8. Stercorarius Buffoni Coues ex Boie.

Stercorarius longicaudatus, Brisson, Ornith., 1760, vi. 155. Vieillot, Nouv. Dict. d'H. N. 1819, xxxii. 157. Degland, Ornith. Europ., 1849, ii. 298. Selys-Longchamps, Fauna Belg., 1842, 156.

Lestris longicaudatus, Thompson, N. H. Ireland, iii. 1851, 399.

Cataractes longecauda, Macgillivray, Man. Orn., ii. 1842, 258.

??Catharacta cepphus, Brünnich, Orn. Bor., 1764, 36.

Cataractes parasitica, Macgillivray, Brit. Birds, v.

Lestris cephus, Keyserling et Blasius, Wirbelth. Europ., i. 1840, 240. Bonaparte, Cat. Met. Ucc. Eur., 1842, 80. Bonaparte, Rev. Crit. Degland's Orn. Eur., 1850, 202. Bonaparte, Conspectus Avium., 1856, ii. 209. Des Murs, Traité d'Oologie Ornith., 1860, 551.

Stercorarius cepphus, Gray, Genera Birds, iii. 1849, 652. Lawrence, Gen. Rep. Birds N. A., 1858, 840. Coues, Proceed. Acad. Nat. Sci. Philada., 1861, p. 243.

?Larus parasiticus, Latham, Index Ornithologicus, ii. 1790, 819.

Lestris parasitica, Temminck, Man. Orn., iv. 1840, 501. (Sed non *Larus parasiticus*, Linn., Gmel. et auct.) Lesson, Man. Orn., 1828, ii. 388. Swainson and Richardson, F. B. A. 1831, ii. 430. Nuttall, Man. Orn., 1834, ii. Audubon, Orn. Biog., 1839, iii. 470. Audubon, Synopsis, 1839, 333. Audubon, Birds Amer., 1844, vii. 192, pl. 452. Giraud, Birds Long Island, 1844, 364.

Lestris Buffoni, "Boie, in Meyers' Taschenb., 1810, iii. 212." Boie, Isis, 1822, 562 et 576. Bonaparte, Synop. Birds N. A. 1826, No. 306. Lesson, Traité d'Ornith., 1831, 616. Kaup, Sk. Ent. Eur. Thierw., 1829, 47. Schinz, Europ. Fauna, 1840, i. 391. Schlegel, Rev. Crit. Ois. Eur., 1844, 85.

Lestris Lessoni, Degland, "Mem. Acad. Roy. de Lille, 1838." Juvenis. Schinz, Europ. Fauna, 1840, i. 392. Juvenis.

Lestris crepidata, Brehm, Naturg. Eur. Vög., 1823, 747. Nec Gm., nec Lath., nec Vieillot.

Adult, breeding plumage.—Bill dusky, its nail almost black. Tarsi deep leaden blue; tibiæ, phalanges, interdigital membranes and claws black. Occiput subcrested, more decidedly than in any other species, forming a calotte of brownish black; which color extends downwards on the cheeks,

the feathers before and below the eye, and on the sides of the bill, being of this color. Neck all round, but especially the sides of the head and the peculiarly formed feathers on the latero-nuchal region, light straw yellow. Whole upper parts, with upper wing and tail coverts deep slate; which, on the primaries, secondaries, lateral tail feathers and distal half of central pair, deepens into a pure lustrous brownish black. Under surface of wings and tail deeper slate than the back, but not so deep as the upper surfaces. Chin, throat and upper breast white; gradually becoming obscured with dusky plumbeous, which deepens posteriorly, so that the abdomen and under tail coverts are nearly as dark as the back. Rhachides of first two or three primaries pure white, deepening into brownish black at their extreme apices; of the other primaries, and of the tail feathers (including the central pair) brown, except just at the base, deepening into quite black terminally. The inferior surfaces of all the rhachides are white for nearly their whole length.

Length of culmen 1·15 inches; gape 1·70; cere ·60; unguis about the same; gonys ·30; from feathers on sides of bill to tip ·90; wing 12·50; tail 6·25; central pair 14·00 to 16·00; the projection 8·00 to 10·00 inches; tibiæ bare ·75; tarsus 1·60; middle toe without claw 1·40.

Habitat.—Sea coasts of America and Europe, particularly in the higher latitudes. Interior of Arctic America.—(Kennicott.)

The changes of plumage of this species are strictly homologous with those of *S. parasiticus;* and it is therefore quite unnecessary to present them in this connexion.

As before remarked under head of *parasitica*, it is exceedingly difficult, if not quite impossible, to determine positively to what species the "*parasitica*" and "*cepphus*" of the older authors refer. This confusion is occasioned partly by the brief and vague diagnoses given, and partly by the fact that the two species were really confounded by authors (except Brisson) until comparatively quite a late period. Even so late as 1820 Temminck does not separate the two: his description applies to either, and the synonyms of both are indiscriminately adduced. From which state of things it results that nearly all the older names and citations may be without difficulty referred to either species. This in effect has been really done; some authors, for example, considering Brünnich's or Linnæus' *parasitica* to be the long-tailed species, and others holding a contrary opinion, until the identification of these names has become almost a matter of choice, or rather of tacit agreement among ornithologists. This is the more to be regretted since on it depends the question whether the common or the long-tailed Jäger is to be called *parasiticus*. A glance at the synonymy of the species will show that authors have been about equally divided on these points. Before the introduction of "*Richardsoni*" by Swainson, the common Jäger was usually called "*parasitica;*" but after the adoption of this name "*Richardsoni*" by Temminck, for the common Jäger, the name *parasitica* was for some years almost universally applied to the long-tailed species. In the year 1819, or thereabouts, the name of *Buffoni* was proposed by Boie for the long-tailed species, and was adopted by many writers; while others had recourse to Brisson's old name "*longicaudatus.*" Within the last few years, however, the name "*parasitica*" has again reverted to the common Jäger, while the other species has been usually called "*cepphus,*" after Brünnich. This identification of Brünnich's name is adopted by Gray, Bonaparte, and other writers. Our reasons for rather referring it to the *Stercorarius pomarinus* will be found under the head of the latter.

Granting, as it is undoubtedly wisest to do, that the *parasitica* of Brünnich, Linnæus and Gmelin, is really the common short-tailed Jäger, it still remains an open question to which species we are to refer the *Larus parasiticus* of Latham. I incline to the opinion that it is based upon the long-tailed species, for the following reason: Although the diagnosis is brief and unsatis-

factory, and although the synonyms of the two species are indiscriminately adduced, (thus, *e. g.*, *Larus parasitica*, Linn. and *Catharacta parasitica*, Brünn., with *Stercorarius longicaudatus*, Briss., &c.,) yet in his further description he says of it, "21 pollices longus." The common Jäger never attains to this dimension.

Latham commits the error of giving *Stercorarius longicaudatus*, Briss., as the *male*, and *Stercorarius* ———, Briss., (without a specific name,) as the *female* of his species; whereas, these two citations really refer to the two distinct species.

The specific name "*longicaudata*" of Brisson (1760) being untenable for obvious reasons,—"*cepphus*" of Brünnich (1764) being too indefinite to warrant its employment,—"*parasitica*" of Brünnich (1764) being used for the common Jäger,—the first definite distinctive name for the long-tailed species appears to be "*Buffoni*" of Boie, (1819.) This specific appellation we accordingly adopt.

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Note.—The present paper completes a series of brief reviews of the three most important of the four subfamilies of the Laridæ,—viz.: the Larinæ, Sterninæ and Lestridinæ. In conducting an investigation into the characters and the bibliography of these groups, with special reference to North American forms, it has been thought expedient to issue in advance a brief prodromus, so to speak, of each subfamily as soon as its examination was completed. Combining the results arrived at in the investigation of each of these groups, and making whatever additions or modifications future research may dictate, the writer hopes before long to present a more complete and elaborate Monograph of the North American forms of the Laridæ. It is contemplated to present the anatomical as well as the external characters, both of the higher groups and of the more marked species; the changes of plumage, dependent upon either age, season, sex, or pure accident, which examination of very extensive series may show; together with the bibliography of each species, and a discussion of doubtful points of nomenclature and relationship. The Monograph will be illustrated by colored plates of the bills, wings, feet, &c. of most of the species, showing exactly wherein one differs from another; and no pains will be spared to render it a complete exposition of the present state of our knowledge of this family of birds.

Synopsis of the MARINE INVERTEBRATA collected by the late Arctic Expedition, under Dr. I. I. Hayes.

BY WM. STIMPSON, M. D.

The collections of Dr. Hayes, as might be expected from the thorough search to which the Arctic regions have lately been subjected, and the characteristic paucity of forms existing there, embrace few novelties. They possess, however, great interest, from having been found in great part at localities much nearer the Pole than any previous expeditions have succeeded in reaching on the American side of the Arctic circle. They include some species hitherto found only on the European side. And, we may add, the number of species collected by Dr. Hayes is greater than that brought back by any single expedition which has yet visited those seas, as far as can be judged by published accounts.

Of the localities mentioned below, *Port Foulke* and *Littleton I.* are on the eastern or Greenland shore of Smith's Straits, in lat. 78½°. *Cape Faraday* is on the west shore of the same Straits, in lat. 79° 45′. *Godhavn* is at the southern end of Disco Island, in lat. 69° nearly.

[May,

spirâ subacutâ; suturis valdè impressis; anfractibus quaternis, convexis, ultimo grandi et parum inflato; aperturâ ellipticâ, subtèr marginem incrassatâ et pallido-salmoniâ; labro incrassato, subconstricto; columellâ impressâ et contortâ.

Hab.—Lafayette, Walker Co., Georgia, Rev. G. White, and Verdigris River, Kansas, F. Hawn.

Physa Saffordii.—Testâ fusiformi, subcompressâ, opacâ, albidâ, politâ, crassiusculâ; spirâ parum productâ, acuminatâ; suturis impressis; anfractibus quinis, ultimo grandi; aperturâ ovatâ, grandiusculâ; labro parum expanso, subtèr marginem incrassato et dilutè fusco; columellâ parum incrassatâ et vix plicatâ.

Hab.—Lebanon, Wilson Co., Tenn., J. M. Safford; Verdigris River, Kansas, F. Hawn; Nashville, Prof. Troost.

Physa Hawnii.—Testâ fusiformi, subcompressâ, crassâ, albidâ; spirâ exsertâ, subobtusâ; suturis impressis, ultimo inflecto; anfractibus senis, convexis, ultimo grandi; labro parum expanso, subtèr marginem incrassato et rufo-fuscescente; columellâ valdè incrassatâ vix plicatâ.

Hab.—Verdigris River, Kansas, F. Hawn.

Physa anatina.—Testâ subfusiformi, subinflatâ; diaphanâ, tenui, albidâ; spirâ exsertâ, acuminatâ; suturis valdè impressis; anfractibus senis, convexiusculis, ultimo grandi; aperturâ parviusculâ, subconstrictâ; labro subexpanso, subtèr marginem incrassato et crocato; columellâ medio impressâ, et contortâ.

Hab.—Northern Tributary of the Arkansas River, Kansas, F. Hawn.

Physa parva.—Testâ fusiformi, subconstrictâ, diaphanâ, politâ, pertenui, tenebroso-corneâ; spirâ exsertâ, acuminatâ; suturis impressis; anfractibus quaternis, convexiusculis, ultimo grandi; aperturâ parviusculâ, constrictâ; labro subexpanso, margine acuto; columellâ impressis, vix plicatâ.

Hab.—Verdigris River and Rock Creek, Kansas, F. Hawn.

Physa Showalterii.—Testâ subfusiformi, subinflatâ, subdiaphanâ, subtenui, pallido-cornea; spirâ parùm productâ, acuminatâ; suturis valdè impressis; anfractibus quinis, convexis, ultimo grandi; aperturâ magnâ, ellipticâ; labro regulariter expanso, subtèr marginem latè incrassato et crocato; columellâ medio valdè impressâ, incrassatâ, contortâ, et plicâ indutâ.

Hab.—Uniontown, Alabama, E. R. Showalter, M. D.

Physa Smithsoniana.—Testâ ellipticâ, subtenui, subdiaphanâ, nitidâ, pallido-fuscâ, ferè olivaceâ; spirâ subacutâ; suturis impressis; anfractibus quinis, convexiusculis, ultimo grandi et parum constrictâ; aperturâ elongato-ellipticâ; labro parum incrassato, subtèr marginem tenebroso-fuscâ; columellâ impressâ et contortâ.

Hab.—Loup Fork of the Platte River, F. V. Hayden, M. D.

Physa Warreniana.—Testâ inflatâ, tenui, diaphanâ, nitidâ, albidâ; spirâ obtusâ; suturis impressis; anfractibus quinis, ultimo pergrandi et valdè inflato; aperturâ latè ellipticâ; labro acuto subtèr marginem fusco et albido vittatâ; columellâ medio impressâ et contortâ.

Hab.—Loup Fork of the Platte River, F. V. Hayden, M. D.; Milwauki, Wisconsin, H. C. Grosvenor; and Grand Rapids, Michigan, A. O. Currier.

Physa Traskii.—Testâ valdè inflatâ, parum obliquâ, striatâ, subdiaphanâ, tenuissimâ, pallido-castaneâ; spirâ parùm productâ; apice acuto; suturis impressis; anfractibus senis, ultimo pergrandi et valdè inflatâ; aperturâ latè expansâ; labro acuto, subtèr marginem fusco-vittatâ; columellâ medio impressâ et magnâ plicâ indutâ.

Hab.—Rio Los Angelos, California, J. B. Trask, M. D.

Physa striata.—Testâ latè ovatâ, obliquè inflatâ, latè striatâ, subdiaphanâ,

pertenui, color columbæ; spirâ subobtusâ; anfractibus quinis, convexiusculis, ultimo pergrandi; aperturâ magnâ, latè ellipticâ; labro regulariter expanso, subtèr marginem parùm incrassato et crocato; columellâ medio impressâ, parùm incrassatâ et plicâ indutâ.

Hab.—Salt Lagoon, near Monterey, California, J. B. Trask, M. D.

Physa Blandii.—Testâ ovato-subfusiformi, subobliquâ, inflatâ, dilutè stramineâ vel albidâ; spirâ obtusâ; suturis impressis; anfractibus quaternis, ultimo inflato et pergrandi; aperturâ ovatâ, subgrandi; labro expanso, subtèr marginem incrassato et pallido crocato; columellâ incrassatâ, impresssâ, plicatâ et contortâ.

Hab.—California, Mr. Thomas Bland.

Physa Nuttallii.—Testâ inflatâ, subdiaphanâ, parùm nitidâ albidâ; spirâ obtusâ, curtâ; suturis impressis; anfractibus quaternis, convexis, ultimo pergrandi et inflato; aperturâ grandi, subrotundâ, subtèr marginem pallidofuscâ; labro acuto, valdè expanso; columellâ leviter incrassatâ, et contortâ.

Hab.—Lewis' River, Oregon, Prof. Thomas Nuttall.

Physa venusta.—Testâ subcylindraceâ, tenuissimâ, diaphanâ, nitidâ, albâ; spirâ curtâ, acuminatâ; suturis leviter impressis; anfractibus quaternis, convexiusculis, ultimo pergrandi; aperturâ magnâ, elongato-ovatâ, subtèr marginem fuscâ; labro acuto et sinuoso, vix expanso; columellâ parum impressâ.

Hab.—Near Fort Vancouver, Oregon, Sir George Simpson.

Physa hordacea.—Testâ subcylindraceâ, pellucidâ, politâ; dilutè rufâ; spirâ subelevatâ subacutâ; suturis subimpressis; anfractibus quinis, ultimo grandi et inflato; labro acuto, margine rufo lineato; aperturâ ovatâ, supernè acutè angulatâ; columellâ aliquantò impressâ et incrassatâ.

Hab.—Vancouver Island, Oregon, Sir George Simpson.

Physa brevispira.—Testâ lævi, lato-ellipticâ, albidâ, diaphanâ, inflatâ; spirâ brevissimâ, obtusâ, vix exsertâ; anfractibus ternis, ultimo grandi et inflato; labro acuto, margine intus incrassato; aperturâ pergrandi et dilatatâ; columellâ incrassatâ, impressâ et contortâ.

Hab.—Ottowa River, Canada West, E. Billings, Esq.

A Critical Review of the Family PROCELLARIDÆ:—Part II.; Embracing the PUFFINEÆ.

BY ELLIOTT COUES, M. D.; U. S. A.

The present paper is the second of a series in which it is proposed to consider the entire family of Petrels. The first fasciculus in which the Procellarieæ or "Stormy Petrels" are reviewed, has already appeared in these Proceedings; in the present continuation of the subject are embraced the Puffineæ, or "Shearwaters."

In writing upon the Procellarieæ I had regard more particularly to the generic disposition of the species; for most of them were so well known as to require comparatively little comment upon their specific distinctions. With the Puffineæ, however, the case is exactly the reverse. While the generic groups are very plainly indicated, the species comprised in each are for the most part quite numerous, and their relations to each other, generally so very intimate, as regards size, form, and color, that it requires careful and discriminating comparison to separate them. I have, therefore, given this part of the subject in hand special attention; and have gone considerably into details in my examination of the specific characters and relationships of the numerous components of the group, believing that in no other way can the desirable degree of information on the subject be attained. At

the same time the many intricate questions of synonymy involved have necessitated somewhat lengthy discussions.

In my arrangement of the genera and species I have closely followed that given by Bonaparte in his Conspectus; except that I place among the Puffineæ the genus *Adamastor*, which Bonaparte considers as belonging to the Fulmareæ. The position of this genus is, indeed, a little uncertain, the characters of the bill approximating to those of the Fulmareæ. Its bill, however, is almost identical with that of *Majaqueus;* and it agrees so closely in other respects that the two genera cannot be placed in different groups: while the possession by each of twelve, instead of fourteen or sixteen rectrices, plainly indicates that they belong to the Puffineæ rather than to the Fulmareæ.

The Puffineæ, as I regard them, are composed of five genera, viz:—*Majaqueus*, *Adamastor*, *Thiellus*, *Nectris* and *Puffinus*. The two first of these are very different from the three last in many respects; and warrant a subdivision of the section into two groups. The first, or the "*Fulmar-Puffins*," have the bill stouter than ordinary; the nasal tubes longer, more elevated, more decidedly tubular, vertically truncated at their apices, and the nasal septum thinner; the wings and tail shorter. The three latter of the above-named genera constitute the "*Puffins* proper." The bill is very long and slender; the nasal tubes short, broad, depressed, obliquely truncated; the nasal septum thick; the wings and tail very long, the latter much rounded; and the feet very large. As for the genera themselves, they are hardly worth retaining, except it be for convenience' sake. *Thiellus* is merely *Nectris* with a longer and more decidedly cuneiform tail; while *Nectris* hardly differs from *Puffinus*, except in its rather slenderer bill, and entirely fuliginous color. The subdivision of *Puffinus* into "Ardenna," "Priofinus," and "Puffinus" seems quite unwarrantable.

I shall consider the species of the five genera in the order in which they are named above, and conclude with a brief synopsis of the section in accordance with the results arrived at in the investigation.

MAJAQUEUS, Reich.

Gen. char.—Bill a little shorter than the head, about equal to the tarsus, stout, compressed, higher than broad at the base, the culmen rising immediately from the nostrils, the unguis large, very convex, much hooked. Commissure unusually curved from feathers to unguis, the concavity looking upwards; outline of inferior mandibular rami quite straight to the unguis. Nasal tubes long, (nearly a third the length of the culmen), elevated, laterally obliquely flattened, carinated along the median line, apically vertically truncated, with a considerable emargination; nostrils quite circular: the septum narrow for this section. Wings very short for this family. Tail also exceedingly short, and subtruncated, the graduation of the lateral feathers being slight. Feet stout, the tarsus greatly abbreviated, being much shorter than the middle toe without its claw. Outer toe without claw longer than the middle. Tip of the inner claw reaching the base of the middle one. Of large size, dark color, and exceeding robust form.

The preceding paragraph characterizes a marked and very peculiar genus of Procellaridæ. It is at once distinguished from all its allies by the combination of the large size, extreme robustness of bill and feet, as well of the whole body, the unusually short wings and tail, the dark colors, etc. It is most nearly allied to *Adamastor*, the bills of the types of the two genera being almost identical; but other characters readily distinguish the two.

Two species of this genus are recognized by ornithologists. Dr. Schlegel has well shown that it is rather by peculiarities of form and size that *conspicillatus* is to be distinguished, if at all, from *aequinoctialis*.

MAJAQUEUS AEQUINOCTIALIS, Reich ex Linn.

Procellaria aequinoctialis, Linn., S.N., ed. vi. (1758), Id. ed. xii., i., 1766, p. 213. Gmel. S. N. i., p. 564. Lath. Ind. Orn. ii., 1790, p. 821, et auctorum. *P. aequinoxialis*, Vieillot, Nouv. Dict. d' H. N., 1817, xxv., p. 422. *Priofinus aequinoctialis*, Hombr., et Jacquin. *Majaqueus aequinoctialis*, Reich, Syst. Av., pl. 20, fig. 340, 341. Bonaparte, Consp. Avium, ii. 1856, p. 200.

Puffinus capitis Bonæ-spei, Brisson, Ornith. vi. 1760, p. 137. *Procellaria nigra*, Forster, Descr. Anim, ed. Licht. 1844, p. 26. "*Procellaria fuliginosa*, Solander."

Habitat.—"In oceano Australi extra tropicum, (nunquam visa ad lineam aequinoctialem, unde patet, in ipsum nomen '*aequinoctialis*' non quadrare." (FORSTER).

It is unnecessary to give any description of this long and well known species.

The white spots on the throat and cheeks appear to vary much with age. In the perfectly adult bird the triangular gular spot is alone left; that on the cheeks, which is connected with it in immature birds, having disappeared. Very young birds have the under parts almost wholly whitish, which afterwards deepens into fuliginous.

The present is one of the three species of Procellaridæ, (*pelagica, aequinoctialis, capensis*), known to Linnæus in 1758, and given in the sixth edition of his Systema Naturæ. The name *aequinoctialis* appears, according to the observations of most naturalists, to be geographically erroneous; and probably on this account it was changed to *nigra* by Forster in 1772. But as it is impossible to say exactly what are the limits of a Procellaridian's wanderings, it would be hardly warrantable, I think, to change Linnæus' appellation.

There are no points of synonymy which require discussion here.

MAJAQUEUS CONSPICILLATUS, Bp. ex Gould.

Procellaria conspicillata, Gould, Ann. et Mag. N. H., 1844, 1ma. series xiii., p. 362. Id. Birds Austr. vii. pl. 46. Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 20. *Majaqueus conspicillatus*, Bonap. Consp. Av. ii., 1856, p. 200.

Procellaria larvata, Lesson.

Habitat.—Australian Seas.

This species, despite the peculiar markings of the head, which usually characterize it, is, nevertheless, exceedingly closely allied to the preceding. Examination of the large series in the Philadelphia Academy collection shows the markings to be very variable as to their extent, and that they are sometimes hardly traceable at all. (Consult on this point Dr. Schlegel's monograph, where the point is fully elucidated.) In the majority of specimens the submental white patch is more or less perfectly connected with a broad white stripe, which, passing from the feathers on the side of the lower mandible, runs backwards on the side of the head, below the eye, curving upwards on the occiput, so as nearly to meet its fellow of the opposite side. In addition to this, a broad somewhat crescentic patch occupies the anterior portion of the vertex, and descends on the cheeks in front of the eyes nearly or quite to the commissure of the bill, leaving the features of the extreme front black. The colors in every other respect are those of *aequinoctialis*.

More constant and reliable, though not so conspicuous, diagnostic features are to be found in other characters. The bird is larger than *aequinoctialis;* its bill is a little longer and considerably more robust, and has the unguis of both mandibles *bluish black* instead of bright yellow. The sides of the mandibles are also usually much darker in color. The wings and tail, on an average, exceed those of *aequinoctialis* by an inch or so, but the variation with individuals of both species amounts to more than this. A corresponding relative difference exists in the average length of the tarsus and toes.

[April,

There are no points of synonymy connected with this species which require notice.

ADAMASTOR, Bon.

Char. Gen.—Of large size and robust form. Bill a little shorter than the head, about three-fourths the tarsus, broad and stout at the base, narrowing regularly to the strong, very convex compressed unguis. Nasal tubes longer than ordinary (for the Puffineæ) very broad, depressed, but vertically truncated at their extremity, and with an unusually thin septum, somewhat as in the Fulmareæ, to which the genus bears considerable analogy. Wings rather short for this section; the primaries broad and stout, the second quite as long as the first. Tail rather short, of twelve feathers; the central rectrices projecting and a little acuminate; the lateral more rounded, and rapidly graduated. Feet of the usual size, moderately compressed and stout. Tarsus shorter than the middle toe without its claw. Outer toe longer than the middle. Tip of outer claw about reaching base of middle.

The genus *Adamastor* was founded in 1856 by Bonaparte to accommodate certain Procellaridians, which seem to combine in a remarkable manner the characteristics of both the Fulmareæ and the Puffineæ. The species resemble most the Fulmareæ in the length, vertical truncation and thin septum of the nasal tubes; and also less markedly in the shape of the wings and tail. In all other respects they are, however, true Puffineæ. The bill, in shape and comparative size, can hardly be distinguished from that of *Majaqueus aequinoctialis*, which is one of the Puffineæ. The most essential character of the bill of the Fulmareæ is that the outline of the unguis of the lower mandible is about straight and ascending; that of the Puffineæ is very concave and decurved. *Adamastor* possesses the latter character. Again, the tail of the Fulmareæ has fourteen (*Fulmarus*) or sixteen (*ossifraga*) rectrices; the tail of *Adamastor* but twelve. The large stout feet, too, are those of Shearwaters, and not of Fulmars. From these manifold considerations I think that it is manifest that the proper affinities of the somewhat anomalous genus are decidedly with the Puffineæ, rather than with the Fulmareæ, among which Bonaparte has located it.

It is not a little surprising that so great confusion and uncertainty should have reigned concerning so marked a species as *P. cinereus*, Gmel, the type of this peculiar genus. On my remarks, infrà, upon *A. cinereus*, and also upon *Puffinus Kuhlii*, I hope I have elucidated several vexed questions of synonymy satisfactorily.

Three species are known to me to compose this genus.

ADAMASTOR CINEREUS Coues ex Gmel.

Procellaria cinerea, Gmelin, Syst. Nat., I. pars 2, 1788, p. 563. Latham, Ind. Ornith., ii. 1790, p. 824. Vieillot, Nouv. Dict. d'H. N., 1817, xxv. p. 418. Sed non *Proc.* vel *Puff.* vel *Nectr. cinereus*, Kuhl, Cuv., Temm., Degl., Keys. et Blas. Schinz., Schleg. nec al auct. Europ. recent. ferè omnium, quæ *P. Kuhlii*, Boie: nec Audubon, et auct. Americ. quæ *P. major* Faber.

Puffinus cinereus, (Gm.) Lawrence, Birds N. A., 1858, p. 835; ex California. (Homonyma accuratè enumerata; descriptio præstans; et observationes pertinentes.)

Procellaria hæsitata, Forster, Descript. Anim., ed. Licht., 1844, p. 208. Gould, Birds Austr., vii. pl. lxvii. et Reichenbach, Syst. Av., pl. xxiv. fig. 2604; nec Kuhl, Beit. Zool., p. 142; nec Temm., Pl. color tab. 416; quæ species *Astrelatæ* generis, teste Bonaparteo. *Puffinus hæsitatus*, Lawrence, Ann. New York Lyc. Nat. Hist., 1853, vi. p. 5.

Adamastor typus, Bonaparte, Consp. Avium, ii. 1856, p. 187. Comptes Rendus Ac. Sc. Tab. *Longip.*—*Procellaria adamastor*, Schlegel, Monog. Proc. Mus. Pays-Bas, 1863, p. 25.

Puffinus Kuhlii, Cassin, Proc. Acad. Nat. Sci. Philada., June, 1862, p. —
(Specimena ipsa a me visa.) Sed non Boie, nec auct.

?*Procellaria melanura*, Bonn, Encyc. Method.

*Description.**—Form typically that of the genus, which see, *suprà*.

Color.—The nasal tubes, and culmen as far as the unguis, are black; the unguis is pale yellowish. The sides of the upper mandible, as far as the sulcus which separates them from the culmen, yellow, as are the sides of the lower mandible and its unguis; the sulcus of the lower mandible and its commissural edge being bluish black. [Compare Forst. Descr., p. 208.] Feet in the dried specimen dingy bluish or yellowish green, dusky exteriorly and posteriorly, the webs yellow, the claws light brown, with black tips. Above a uniform cinereous, of much the same shade over the whole upper parts; some of the feathers, especially the scapulars and tertials, with just appreciably lighter tips; the crown of the head and the circumocular region a little deeper cinereous than elsewhere. The wing coverts of the specimen in question are interspersed with feathers of a dull brownish rather than cinereous hue. These are evidently old worn ones, and doubtless indicate that in this species, as in others, the newer and fresher the feathers the clearer and more decided is the *cinereous* hue. The color of the upper parts has no line of demarcation with the white of the lower on the sides of the head and neck. Insensibly fading away, it extends quite around on the chin and throat, but is more restricted on the sides of the neck. The primaries are blackish cinereous on their outer webs and at their tips; light greyish cinereous internally and basally; their shafts are light brown. The inferior surfaces of the wings, together with the axillary feathers and some feathers on the sides of the body under the wings, are dull brownish cinereous. The tail feathers and the entire under tail coverts, from the anus backwards, are deep blackish or sooty cinereous, the rectrices the darkest. The rest of the under parts are white.

Dimensions.—Length about 19 inches. Bill along culmen 1·80; from feathers on side of lower mandible to its apex 1·50; height of bill at base ·65; width of bill at base ·60. Wing from the carpus 13·00; tail 5·75; exterior rectrices 1·25 shorter. Tarsus 2·40; middle toe and claw 2·90; outer do. 3·00; inner do. 2·50. Length of nasal tubes ·45, inches and hundredths.

Bibliography.—As I have endeavored to prove, in my discussion of the synonyms of *P. Kuhlii* (which see), the *Proc. cinerea*, Gmelin, is really the present species, and not the common Atlantic bird to which the name *cinereus* has been generally applied by European authors. Bonaparte, indeed, was completely convinced of this; and it is the more singular that he does not adopt Gmelin's name, but prefers to confer a new specific designation,—viz.: *typus*, in direct violation of one of the most firmly established laws of nomenclature. To Mr. G. N. Lawrence is due the credit of restoring Gmelin's name to the species to which it rightfully belongs.

The *Proc. hæsitata* of Forster is most undoubtedly, I think, the present species. His description is pertinent in every respect; and his remarks concerning the form and color of the bill will apply to no other species. The *hæsitata* of Gould's Birds of Australia, and of Lawrence, (Ann. New York Lyc. Nat. Hist.,) is the same bird. The *hæsitata* of Kuhl's Monograph and of Temminck's Planches Colorées is apparently, however, not this species, but the *Astrelata diabolica*, Bp. ex L'Herm.

I quote "*P. melanura*, Bonn." on authority of Bonaparte, not having an opportunity of verifying the reference.

* The accompanying description was taken from a fully mature specimen from the coast of California, off Monterey, kindly furnished for examination by Mr. Lawrence. It is the example from which Mr. Lawrence's description of *P. hæsitata*, in the Annals of the New York Lyceum, and of *P. cinereus*, in the Birds of North America, was taken; is not incompatible in any feature with *P. cinereus*, Gm., Lath., Vieill.; agrees entirely with Forster's *P. hæsitata*, with Bonaparte's *Adamastor typus* and Schlegel's *Proc. adamastor*.

The following resumé of the points under discussion is given for convenience of reference:

Proc. cinerea, Gm., Lath., Vieill. (1817); (nec auct. Europ. quæ *P. Kuhlii*, Boie; nec auct. Amer. quæ *P. major*, Faber) = *Puffinus cinereus*, Lawrence, 1858 = *Adamastor typus*, Bp., 1856 = *Proc. adamastor*, Schlegel, 1863 = *Adamastor cinereus*, Coues, 1864.

Proc. hæsitata, Forst., 1774 = *Puff. hæsitata*, Lawrence, 1853 = *P. hæsitata*, Gould (sed non *P. hæsitata*, Kuhl, 1823, nec Temm. Pl. Color. quæ species *Astrelatæ*) = *P. cinereus*, Gm.

Dr. Lichtenstein, in his edition (1844) of Forster's Descriptiones Animalium, says that the *leucocephala* of Forster (which is also the *alba* of Linn., Gm., Lath.) "vix nisi ætate videtur differre a *hæsitata* Forster." It is well known that the present species when young has the cinereous of the head much lighter than that of the adults; and Prof. Lichtenstein's surmise may therefore be correct. As, however, there are several points of form, etc., in which it seems to differ from *hæsitata*, and especially as Bonaparte has considered it a valid species of *Astrelata*, I shall follow the latter authority until more definite data may be found upon the subject.

ADAMASTOR GELIDUS Coues ex Gmel.

Procellaria gelida, Gmelin, Syst. Nat., i. pars 2, 1788, p. 564. Latham, Index Ornith., ii. 1790, p. 822. Vieillot, Nouv. Dict. d'Hist. Nat., xxv. 1817, p. 419. (Haud dubiè, opinor.)

Procellaria flavirostris, Gould, Ann. et. Mag. N. H., 1844, 1ma ser. xiii. p. 365. *Adamastor flavirostris*, Bp. Consp. Av., 1856, ii. p. 188.

Habitat.—Antarctic Ocean. Cape of Good Hope.

Sp. char.—"Feathers of the head and all the upper surface brown, with paler edges, fading into white on the tips of the upper tail coverts; wings and tail deep blackish brown; all the under surface pure white; the feathers of the under surfaces of the shoulders with a streak of brown down the centre; bill yellow, passing into dark horn color at the tip; tarsi and feet fleshy white.

"Length 19 inches; bill $2\frac{4}{5}$; wing 15; tail $6\frac{1}{2}$; tarsi $2\frac{3}{8}$; middle toe and claw $3\frac{1}{8}$."—[GOULD.]

This is an exceedingly well marked species, liable to be confounded with no other with which I am acquainted. That it is a species of *Adamastor*, and entirely congeneric with *A. cinereus*, there can be, I think, no doubt. The general coloration and the proportions as indicated by the measurements, plainly evince this to be the case. Moreover, Mr. Gould himself remarks that "this bird so nearly approaches in form the members of the genus *Puffinus*, that it is almost a question whether it should not be included in that genus." A bird which could be placed by so accurate an ornithologist as Mr. Gould in the genus *Procellaria* (*i. e.* among the Fulmareæ), and which yet exhibits such an affinity with the Puffineæ, cannot but belong to the genus *Adamastor*.

Discussion of synonymy.—I think there can be no reasonable doubt that the old *P. gelida* of Gmelin, Latham and Vieillot is really the present species. The habitat and the dimensions given by these authors is the same as that assigned to *flavirostris* by Mr. Gould; and their diagnoses are pertinent in almost every particular. The expression "pedibus cæruleis" is indeed quite inadmissible; but a misinterpretation of the color of the feet of birds of this family is extremely likely to occur when only dried skins are examined. Still I would hardly venture to supersede Gould's *flavirostris* by Gmelin's or Latham's *gelida*, were it not for the fuller and more perfect description of the species given by Vieillot in the work above quoted. An examination of his description will show that it differs in no single conse-

quential point.* In view of these facts, and deeming it of the utmost importance to identify as many of the names of the older authors as possible, I have thought it best to restore Gmelin's appellation.

ADAMASTOR SERICEUS Bp. ex Less.

Puffinus sericeus, Lesson, Man. Ornith., ii. 1828, p. 402. *Adamastor sericeus*, Bp., Consp. Av., 1856, ii. p. 188.

Habitat.—Southern Pacific Ocean.

Sp. char.—Bill black; feet flesh-colored, the margins of the webs blackish. Upper parts deep greyish ashy, passing into blackish grey on the upper wing coverts. Head, neck and under parts white; the former variegated with some touches of clear greyish ash. Circumocular region blackish. Inferior surfaces of the wings of a lighter color than the superior. Tail rounded, its upper surface lightly washed with ashy.

Length 15 inches; extent of wings 36; wing from the carpus 11·50; tail 5; bill along gape 2·00; nasal tubes ·40; tarsus 1·75; middle toe 1·33.

The preceding description is compiled from Lesson's original notice. The indications are not as explicit as might be desired; but I think that there can be no doubt of the propriety of Bonaparte's referring the species to his genus *Adamastor*. The pattern of coloration is rather that of most of the species of *Astrelata;* but the proportions as indicated by Lesson's measurements indicate a bird congeneric with *Adamastor cinereus*.

I have met with no synonyms of this species requiring notice.

THIELLUS Gloger.

Char.—Bill long and slender, about three-fourths the tarsus, compressed, the unguis much decurved, but at base broader than high. Nasal tubes very short, only a fifth of the culmen. Wings of moderate length, and ordinary shape. Tail unusually lengthened, being nearly or quite half as long as the wing from the carpus, very much graduated. Tarsus a fourth longer than the bill, moderately stout, compressed. Middle toe without a claw, a little longer than the tarsus. Of moderate size, rather slender form and uniformly fuliginous colors.

The most essential character of the genus is found in its unusually elongated and much graduated tail. In all other respects it hardly differs at all from *Nectris;* and its species have all the same fuliginous hue that characterizes the latter genus.

Two species are recognized by ornithologists as belonging to this genus. Though exceedingly closely allied to each other, yet they seem to constantly differ in some applicable points.

THIELLUS SPHENURUS Bp. ex Gould.

Puffinus sphenurus, Gould, Ann. et Mag. N. H., 1844, 1ma series, xiii. p. 365. Id. Birds Austral., vii. pl. 58. *Thiellus sphenurus*, Bonap., C. A., 1856, ii. p. 201.—*Procellaria sphenura*, Schlegel, Mon. Proc. Mus. Pays-Bas, 1863, p. 25.

Habitat.—Australian seas.

A fine series of these species is in the collection of the Philadelphia Academy. The general color of the plumage is a deep chocolate brown, or dark reddish black, most of the feathers of the upper parts with paler margins. The color of the back deepens into pure black on the wings and tail. Below, the general plumage is of a deep brown, with a wash of grey,—the brown tinge most palpable on the abdomen, the grey predominating on the throat.

* I may remark, *en passant*, that the expression "près de *huit* ponces de longueur totale" is most probably a typographical error, or a *lapsus calami*. It was evidently intended to be "*dix huit*."

The bill is flesh color, tinged with brown; much darker along the culmen and on the unguis; the legs and feet are flesh colored, with a tinge of yellow.

This species measures from 15 to 16 inches in total length; the wing from the carpus 10·50 to 11·25. The tail varies somewhat in length, from nearly five to quite six inches; the graduation of the lateral feathers usually being about 2 inches. Bill about 1·60; height at base ·35, width ·50; length of nasal tubes ·25. Tarsus 1·90; middle toe and claw 2·35.

This species can be confounded with no other, (except, perhaps, *T. chlororhynchus*, which see;) and there are no involved points of synonymy.

THIELLUS CHLORORHYNCHUS Bp. ex Less.

Puffinus chlororhynchus, Lesson, Tr. Ornith., p. 613. Pucheran, Rev. Zoologique, 1850, p. 633. *Thiellus chlororhynchus*, Bp., Consp. Av., ii. 1866, p. 201. *Procellaria chlororhynchus*, Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 25.

Habitat.—"Western Australia," Bp. Dr. Schlegel has specimens from the Bourbon Islands and the Cape of Good Hope.

Almost identical with *T. sphenurus* in the color of the plumage; and with much the same dimensions. The main diagnostic points seem to be the following: The bill is of a greenish orange color, except along the culmen and at the tip, where it is black. The bill is longer than that of *sphenurus* by about a fourth of an inch on the average, and appears a little larger at the base, though quite slender in its continuity. While *chlororhynchus* is, upon the whole, a larger bird than *sphenurus*, nevertheless the wings are absolutely shorter (½ an inch or more) on an average. The feet are slightly longer and stouter. In color the present species differs slightly in being rather more cinereous below; but the difference is not well marked.

The species not as yet a well known one, nor contained in many musæa.

NECTRIS Bp. (emend. ex Forst.)

Char.—Generally similar to *Puffinus;* colors uniformly fuliginous; bill and feet wholly or partially light colored. Bill long and slender, much hooked at the tip; nasal tubes short, broad, depressed, very obliquely truncated, the septum broad, the nostrils narrowly oval. Wings reaching a little beyond the tail, which varies in length, but is always more or less rounded. Feet moderate; tarsus about equal to middle toe without claw; outer toe without claw equal to middle; tip of inner claw not reaching base of middle one.

This genus comprises five, perhaps six, species, all agreeing in the uniform fuliginous of their plumage, and in the partial or entire paleness of the bill and feet. In form it hardly differs from *Puffinus*, and its retention as a valid genus is perhaps questionable, except as a matter of convenience in a group where it is of importance to distribute the numerous closely-allied species in as many groups as may be at all characterizable.

NECTRIS FULIGINOSUS, Keys. et Blas. ex Strickl.

Puffinus fuliginosus, Strickland, Proc. Zool. Soc. Lond., 1832, p. 129. Lawrence, Birds N. A., 1858, p. 803, et auct. recent. Sed non *Proc. fuliginosa*, Gm., Lath., quæ probabiliter species *Thalassidromæ* (caudâ furcatâ ex "Otaheite"); nec Banks, tab. 19, Kuhl, sp. 12, pl. x. fig. 6; quæ certè *Pterodroma atlantica*, Gould. Quid sit *Proc. fuliginosa*, Kuhl, p. 148, sp. 27 (ex Banks,) nescio.—*Nectris fuliginosa*, Keys. et Blas. Wirbelt. Europ., 1840, p.

Puffinus major fœmina!) Temminck, Man. Orn., iv. 1840, p. 506. *Puffinus cinereus* (fœmina!), Gould, Birds Europ., pl. 445, fig. 2.

Habitat.—More northern portions of the Atlantic Ocean; especially numerous off the coast of Newfoundland; more rarely on the European coast.

Sp. ch.—Upper parts a uniform fuliginous brownish black, the primaries and tail feathers of a deeper color; under parts a much lighter fuliginous

brown, passing into greyish on the throat. Bill entirely brownish black. Feet brownish black, the internal face of the tarsus and the interdigital membranes dusky yellowish. Length, 18 inches; wing, from the carpus, about 12. Bill along culmen, 1·72 to 2·00; along commissure, 2·50; tarsus 2·20 to 2·30; middle toe about 2·50.

This species is too well known to require further characterization.

Discussion of synonymy.—The name "*fuliginosus*" has unfortunately been almost as badly bandied about as has *cinereus*, Gm. Thus the *fuliginosus*, Gm., Lath., apparently (and it is so looked upon by most ornithologists,) belongs to a species of the genus *Thalassidroma*, Vig., from Otaheite, probably not very widely differing from the *Cymochorea melania*, mihi, ex Bp. *Fuliginosa*, Banks, (tab. 19,) Kuhl, (sp. 12, pl, x. fig. 6,) is a species subsequently called *atlantica* by Gould, now the *Pterodroma atlantica*, Bp. Exactly what is the *fuliginosa*, Forster, (Descr. p. 23, sp. 18), is a little doubtful. His editor, Lichtenstein, says that it is the same as *fuliginosa*, Kuhl, sp. 12; and this opinion is also maintained by Bonaparte, which would make it the *Pterodroma atlantica*. But then, on the contrary, Dr Kuhl asserts positively that his species 12 is "omnino diversa a *Nectri fuliginosa*, Forst." For my own part, after carefully studying Forster's description, I am inclined to coincide with Dr. Kuhl, and to hold that Forster's *fuliginosa* is not the *Pterodroma atlantica*, but rather a pacific species of the genus *Nectris*.

Species 27 of Kuhl's monograph, also called *fuliginosa* (after Banks, tab. 23), is too indefinite for me to make anything of it.

No other synonyms of this species seem to require notice. The confounding of this species with *carneipes*, Gould, by Dr. Schlegel, will be noticed under the head of the latter.

NECTRIS AMAUROSOMA, Coues, nov. sp.

Diagnosis.—*Nectris* media quoad staturam inter *fuliginosam* vel *carneipedem* et *tenuirostrem* vel *brevicaudam;* corpore brunneo-fuliginoso, subtus valdè dilutiore, in gulâ fusco-cinerascente; tectricibus alarum inferioribus albidis ferè meris; rostro ex toto fusco; pedibus internè palamisque carneis, externe brunneo-albis. Long. alæ 11·00 poll. Ang. Rostri à fronte ad apicem 1·70. Tarsi 2·00. Digiti medii cum ungue 2·40. Caudæ, 4·25.

Habitat —Mare Pacif., circum capit. Sanct. Lucas, Calif.

Description.—Form. Bill about as long as the head, a little shorter than the tarsus, about two-thirds the middle toe and claw; rather slender, attenuated, compressed, except at base, where it is as wide as high; the unguis large, and much hooked; commissure much curved from base to unguis; outline of rami of inferior mandible quite straight. Nasal tubes rather more than a fourth the length of the culmen, broad, but much depressed, with an indistinct median longitudinal groove; terminally exceedingly obliquely truncated; the nostrils oval. The feathers of the front form a very obtuse angle on the culmen, but instead of immediately retreating on either side, they extend forwards again on the sides of the upper mandible, nearly as far as on the culmen. Wings of ordinary length and shape. Tail rather long, contained only $2\frac{1}{2}$ times in the wing from the carpus; much rounded, as usual in the genus. Feet moderately stout; tarsus just equal to the middle toe without its claw; outer toe without its claw longer than the middle; inner toe unusually abbreviated, the tip of its claw falling $\frac{1}{4}$ of an inch short of the base of the middle claw.

Color.—The bill is wholly deep brownish black; somewhat lighter on the sides of the lower mandible; the extremity of both ungues horn colored. The inner aspect of the tarsus, the middle and inner toes, the whole of the webs, and the bases of the claws, clear light yellowish flesh color; the outer aspect of the tarsus, the outer toe, and tips of the claws, the same color, but much tinged with brown. The shade of the upper parts is a pure deep chocolate

brown, without the slightest tinge of ashy; a little darker on the rump, so dark as to be brownish black on the wing coverts and tertials; the extreme tips of which latter are somewhat paler. The primaries are lustrous brownish black on their outer webs and at their tips; and their inner webs are but little paler; their shafts are on their superior aspect black, becoming brownish basally; their inferior aspects also black, but with a delicate white line running medianly two-thirds their whole length. The rectrices are colored like the primaries; their shafts are brownish black. The entire under wing coverts are white; the purity and continuity of which is, however, interrupted by some grayish brown marbling. The under parts generally are much lighter than the upper, and of a grayish rather than brownish fuliginous, this color passing on the throat and chin gradually into a somewhat grayish cinereous hue. The short anterior under tail coverts are light grayish brown; the long posterior ones are more of a brownish fuliginous. There is a delicate touch of white on the under eyelid.

Dimensions.—Length of bill along culmen 1·70; from feathers on side of lower mandible to its top, 1·60; length of nasal tubes, ·45; height of bill at base, ·45; width about the same. Wing, from the carpus, 11·00; tail, 4·25; graduation of lateral rectrices, ·90; tarsus, 2·00; middle toe and claw, 2·40; outer do., 2·30; inner do., 1·90.

It may seem somewhat improbable that a species of *Nectris* has remained to this late day undescribed; but the subject of the present article differs in so many particulars from any known bird of the genus, that I have not the slightest hesitation in presenting it as new. It is most closely allied to *fuliginosa*, Strickl., but differs from it, as well as from *carneipes* and *tenuirostris*, in many very tangible points. The combination of the wholly dark bill, with the coloration of the feet, as above described, the white on the under surfaces of the wings, together with its own particular dimensions, readily characterize it among its congeners. The following detailed comparison of it with each may serve to define its relationships more explicitly.

With the general colors of *fuliginosus*, especially as regards the wholly dark bill, it differs in the conspicuous white under wing coverts, only a little obscured by grayish brown, and in the different tints and pattern of the feet. (Compare original descriptions of each species.) It is much smaller than that species,—to wit: the length about fifteen inches, (as near as I can judge from the skin,) instead of eighteen; the tarsus barely two inches, instead of two and a quarter; the toes less in proportion; and the wing eleven, instead of twelve inches.

It is more nearly of the same size as *carneipes*, but in that species the "whole of the plumage is chocolate black;" the bill is flesh colored, except on the culmen and at the tip, whereas in my bird it is wholly dark. The feet of *carneipes* are wholly "yellowish flesh color," while in *amaurosoma* the external aspect of the tarsus and the outer toe are brownish white.

The species hardly requires any comparison with *tenuirostris* or *brevicauda*, the notable differences of color alone, or of dimensions alone, at once separating them. The bill of *amaurosoma* measures about 1·70 inches; that of *tenuiros.ris* 1·20; the wing 11, instead of 10 inches; the tail 4·75 to 5·00, instead of 3·50, etc. The general color of *tenuirostris* is a deep smoky black, with a tinge of ashy; that of *amaurosoma* brownish fuliginous. Compare also the descriptions given in this paper of the colors of the bill and feet. There is just about the same amount of whitish on the under surfaces of the wings of the two species.

The type of this species, now in the Smithsonian collection, was procured by Mr. John Xantus at Cape St. Lucas, Lower California, August 18th, 1860. It is there apparently the representative of *fuliginosus*, as my *opisthomelas* is of *obscurus*.

1864.]

NECTRIS CARNEIPES, Bp. ex Gould.

Puffinus carneipes, Gould, P. Z. S. xii. March 26, 1844, p. 57. Id. Ann. et Mag. N. H., 1844, xiii. 1ma., series, p. 365. *Majaqueus carneipes*, Reichenbach, Syst. Av., pl. xxiv. fig. 2601. *Nectris carneipes*, Bonaparte, Consp. Av. ii. 1856, p. 201. *Procellaria carneipes*, Schlegel, Mon. Proc. Mus. Pays-Bas, 1862, p. 26, (sinè bonâ ratione *Nect. fuliginosos*. Strickl. conjuncta.)

"*Puffinus cinereus*, Smith, Ill. S. Afric., Bds., pl. 56." "*Nectris gama*, Bp. Consp. Av. ii. p. 202;" de utroque teste Schlegelo.

Habitat.—"Numerous in all the seas bounding the western coast of Australia; and breeding on the small islands off Cape Leeuwin."—[GOULD.]

This species is quite closely allied to *fuliginosus*, but differs from it by exceedingly well marked characters. The plumage is much the same in both species, but the bill of *carneipes* is "fleshy white, the culmen and tips of the mandibles brown; the legs, feet, and membranes, yellowish flesh-color." Besides these differences in color, there appear to be equally marked discrepancies in proportions; thus, while *fuliginosus* is eighteen inches long, and *carneipes* only fifteen, the absolute lengths of the bill, feet, and wings is very nearly the same. (Compare original descriptions by Strickland and Gould.) I have never seen any example so small as the one whose measurements are given by Dr. Schlegel, p. 26 of his monograph, but the limits within which any species of this family may vary are very great. But even granting for a moment the identity of the two species, I do not see upon what authority Dr. Schlegel has given the name *carneipes* of 1844 priority over *fuliginosus* of 1832.

Bonaparte, in his Conspectus, has a species *N. gama*, from South Africa, with which he considers *Puff. cinereus*, juv., Smith, as synonymous. I have never had an opportunity of examining a specimen professing to be of this species; but as the diagnosis scarcely shows tangible points of difference, and as Dr. Schlegel is convinced of its identity with *carneipes*, I shall, for the present at least, follow his authority in assigning it as a synonym of that species.

An excellent suite of specimens of *carneipes* is in the collection of the Philadelphia Academy.

NECTRIS TENUIROSTRIS Bp. ex Temm.

Procellaria tenuirostris, Temminck, Pl. Col., No. 587. Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 26. *Puffinus tenuirostris*, Temm. et Schl., Faun. Japon. Aves., p. 131, pl. 86. *Nectris tenuirostris*, Bonaparte, Consp. Av. ii. 1856, p. 202. "*Proc. curilicus*, Musæorum Berol. et St. Petersburg."

"*Puff. tristis*, Mus. Parisiensis."

Habitat.—Japan, and neighboring seas.

I have before me a typical example of this marked species, from Niphon, agreeing in every respect with the types of the species as described by Schlegel.

The most peculiar character of form of this species is found in the shape of the bill. It is stout at the base, where it is a little broader than high, but rapidly becomes both compressed and depressed, tapering to a small, weak, only moderately hooked unguis. This unusually weak bill is also short, being much less than the head, and only about two-thirds the tarsus. The nostrils measure about a third the length of the culmen. The commissure and outline of the inferior mandibular rami are both nearly perfectly straight. The wings are very long, reaching much beyond the rest; the primaries are all tapering and acute. The tail is exceedingly short, its length being contained nearly three times in the wing from the carpus, the central retrices projecting a little, the lateral rapidly graduated. The feet are moderately large and

stout; the tarsus is about equal to the middle toe without its claw; the outer toe and claw are equal in length to the middle toe and claw; the tip of the inner claw falls short of the base of the middle.

Bill mostly dusky greenish yellow, brighter along the commissure and at tip. Feet yellowish on the anterior, exterior and internal aspect of the tarsus and toes, and the superior surfaces of the webs, the posterior edge of the tarsus, and the under surface of the webs blackish. Above very deep sooty black, becoming pure black on the rectrices and outer webs of the primaries, with a just appreciable ashy nuance on the wing coverts. Inner webs of primaries (except at their tips) and the under surfaces of the wings generally light dull grayish brown. Shaft of primaries black, except along a groove on their under surfaces, which is yellowish. Beneath, the whole body is of a rather light fuliginous or brownish grey, fading, on the throat, (especially in more immature birds) almost into greyish white. The under tail coverts, however, are nearly as dark as the upper parts, only rather more fuliginous.

Dimensions. Wing from the carpus 10·00 inches; central tail feathers 3·50; lateral 2·75; bill along culmen 1·20; depth at base ·30; width at base ·40; tarsus 1·90; middle toe and claw 2·25; outer toe and claw the same; inner toe and claw just equal to the tarsus.

This strongly marked species is distinguished from all its congeners by its small size, weak, peculiarly shaped bill, very short tail, and peculiarly colored feet, The difference in intensity between the colors of upper and under parts are quite appreciable.

Synonymy. The proper name of this species is a matter of no uncertainty, but what designations are to be referred to it as synonyms is more doubtful. Both Bonaparte and Schlegel place "*curilicus*, Pennant," of the museums of Europe, as a synonym, which is merely, however, saying that certain museums have called *tenuirostris*, "*curilicus*," and does not in the least affect the question as to whether *curilicus* be properly a synonym. I am inclined to think that it is not, but that it is rather to be referred to another and larger species of this fuliginous genus.

Bonaparte and Schlegel both consider "*tristis*, Forster, Descr. p. 205," as synonymous with this species. It is difficult to say whether such is or is not the case; but my own impression, derived from a careful study of the characters laid down by Forster, is that his *tristis* refers to a species much larger, and with a stouter bill than the present; possibly the true *curilicus*, Penn.

NECTRIS BREVICAUDA Bp. ex Brandt.

Puffinus brevicaudus, Brandt, "Ic. Rossic, Av. pl. vi. fig. 17." Gould, Ann. et Mag. N. H., xiii. 1ma series, 1844, p. 365. Gould, Birds Austr. viii. pl. 56. *Majaqueus (!) brevicaudatus*, Reichenbach, "Syst. Av. pl. xxxvii. fig. 2271—2." *Nectris brevicaudus*, Bonap., Consp., Av. ii. 1856, p. 201.

Habitat. "Found in all the Australia seas, and breeds in the greatest abundance on several of the islands in Bass's straits." [GOULD.]

"Blackish fuliginous, lighter beneath; bill black, yellowish at the base; feet cinereous, their webs yellow." [BONAPARTE.]

This is a species with which I am autoptically unacquainted, nor have I access to the original description and figure of Brandt, and I am therefore unable to discuss its characters and relationships. By Dr. Schlegel it is placed as a synonym, with a query of *N. tenuirostris*, but other authors all agree in considering it as a valid species.

PUFFINUS Brisson.

Bill about as long as the head, or a little less, about three-fourths the tarsus, rather stout, a little higher than broad at the base, compressed for the

rest of its length; the unguis strong, much hooked; nasal tubes about a fourth the length of the culmen, broad, depressed, obliquely truncated, the septum thick, the nostrils oval; wings long, pointed, first primary longest, surpassing the tail, which is lengthened and more or less rounded, of twelve rectrices. Feet very large and stout; tarsus compressed, as long as the middle toe and claw; outer toe about as long as the middle, but its claw much shorter and weaker; tip of inner claw not reaching the base of the middle one; claws strong, little curved, moderately acute, somewhat depressed, the middle one with its inner edge dilated; hallux extremely abbreviated, only apparent as a short, stout, conical, rather obtuse claw. Of moderate and small size. Bicolor: bill and a portion of the feet usually dark colored.

The genus *Puffinus*, as characterized in the above paragraph, comprises numerous bicolor species, spread all over the world. They form two groups. Those of the first group are large, with robust bills, and have the upper plumage brown or cinereous. They are *major*, *leucomelas*, *Kuhlii* and *creatopus*, which compose the "genus" *Ardenna*, Reich. The species of the second group are all much smaller, with very slender, weak bills, and the upper parts blackish or greyish black. They are *anglorum*, *yelcuanus*, *obscurus*, *opisthomelas* and *nugax*, forming the restricted "subgenus" *Puffinus*.

Puffinus Kuhlii, (Boie.)

Procellaria puffinus, "Linn.," Temminck, Manuel d'Ornith., ii. 1820, p. 805. Vieillot, Fauna Franç, 1828, p. 404, et auct. al. aliq. sed non Linnæi, quæ certè *P. anglorum*, Ray.

Procellaria cinerea, Kuhl, Mon. Proc. Beit. Zool. p. 148, pl. ix. fig. 12; ex oc. Atlantico Schlegel, Mon. Proc. Mus. Pays-Bas, 1863, p. 24; ex ocean. Atlant. Sed *non* Gmelini, vel Lathami quæ certè *Adamastor typus*, Bp. est, ut benè et sæpè vindicata est a Bonaparteo; ex maribus antarcticis præcip, Pacif.

Puffinus cinereus, Cuvier, Temminck, Man. Orn., vol. iv., 1840, p. 506. Degland, Ornith. Europ. ii. 1849, p. 362, et al. script. Europ. recent. fere omnium. Sed non Audubon, et auct Amer. qui *P. major*, Faber: non Lawrencii, qui *Adamastor cinereus* hujus opusculi. *Nectris cinereus*, Keys. et Blas. Wirb. Europ. 1840, p. xciv.

Procellaria Kuhlii, Boie, Isis von Oken, 1835, p. 257, sp. 25. *Puffinus Kuhlii*, Bonaparte, Consp. Av. ii. 1856, p. 202. (Sed non Cassin, Pr. A. N. S. Philada., 1862, p. 327, quæ *Adamastor cinereus*, mihi, testibus speciminibus ipsis.)

Discussion of Synonymy.—There is in the Atlantic Ocean a very common and well known Procellaridian, to wit, the "cinereous Shearwater," a bird about the size of *Puffinus major*, Faber, but otherwise quite distinct from it in form, color, etc. This bird was named *Procellaria Kuhlii* by Prof. Boie, in 1835. (Isis von Oken, p. 257, sp. 25, which consult.) From Boie's excellent characterization, and from the very marked distinctive features of the bird itself, there need have been no confusion or uncertainty regarding it. But before 1835, so common and well known was the bird, that it had been noticed by numerous other writers, and unfortunately most of them had erroneously applied to it Gmelin's name *cinerea*; while others had with equal inaccuracy called it *P. puffinus*, Linnæus. When more recently C. L. Bonaparte attempted to show that "*cinereus*, Gm., Lath.," was not the common Atlantic bird at all, but a Pacific species, (described as *P. haesitata* by Forster) and properly the type of a genus (viz., *Adamastor*, Bp.) distinct from *Puffinus*; the assertion was illy received by ornithologists, and the general confusion rather augmented than diminished. To the following attempt to unravel the knotty points of synonymy involved, I would invite the particular attention of ornithologists, as I hope to be able to sustain the position assumed by Bonaparte.

[April,

The following is Gmelin's diagnosis, in copying which the italics are my own: S. N. i. pars ii. p. 563, sp. 17. "Pr. *cinerea, subtus alba*, cauda nigra, *rostro flavicante, pedibus cærulescentibus.* "Cinereous Fulmar," Latham, Syn. iii. p 405, No. 10. *Habitat intra circulum antarcticum*; glacialis magnitudine: $20\frac{1}{4}$ pollices longa." It will be noticed that Gmelin's bird is one from the Antarctic seas, as large as the common Fulmar, and with exactly the characters of the bird afterwards designated as *Adamastor typus* by Bonaparte. Gmelin's further description will be found to confirm this opinion by each of its sentences. I do not see, therefore, how it is possible to consider it as referring to a North Atlantic species, with characters so very different as are those presented by *P. Kuhlii*, Boie.

The *Proc. cinerea*, Lath., Ind. Ornith., ii. 1790, p. 824, and the *Proc. cinerea*, Vieillot, Nouv. Dict. D'H. N. 1817, xxv, p. 418, are both exactly the same as Gmelin's *cinerea*, and so is the *Puffinus cinereus* of Lawrence, Bds. N. A., 1858, p. 835, from the Pacific Ocean, under which head the synonyms of *Adamastor typus* are accurately enumerated.

The above is all that is necessary to be said, I think, to substantiate Bonaparte's position, that *P. cinereus*, Gm., is not the Atlantic bird afterwards named *Kuhlii* by Boie. The subject will be resumed and the generic and specific characters of *Adamastor typus*, as distinguished from those of *Puffinus Kuhlii*, will be enlarged upon in another place. It now only remains to discuss the various synonyms of *Kuhlii*.

The first instance of the misapplication of Gmelin's name, *cinereus*, which I have been able to find, is that by Cuvier, when he calls *P. Kuhlii* "*P. cinereus.*" This same malidentification has also been committed by Bonaparte, (Comp. List, Bds. N. A. and Eur., 1838, p. 64.) Degland, (Ornith. Europ., 1849, ii. p. 362;) Temminck, (Man. Orn., iv. 1840, p. 506; Schinz,) (Europ. Faun., 1840. i. p. 393;) Schlegel, (Rev. Crit. Ois. Eur., 1844, p. 132;) Keyserling and Blasius, (Wirb. Europ., 1840, p. 94.)

The *Puffinus cinereus* of Bonaparte (Synop. Bds. N. A., 1828, p. 370,) of Nuttall, (Man. Ornith., ii. p. 334,) and of Audubon's works, (Orn. Biogr. vol. iii. p. 555; Bds. N. Amer., vii. 1844, p. 212, pl. 456,) is, however, not the *P. Kuhlii* but the *P. major*, Faber.

"The *Procellaria puffinus*, L.," of Temminck, (Man. Orn. 1820, ii. p, 805;) and of Vieillot, (Fauna Franç, 1828, p. 404) are synonyms of *P. Kuhlii*.

Yet another improper reference of Gmelin's *cinereus* is found in Degland's Ornithologie Européene, where it is placed as a synonym (with a query, however,) of *P. major*, Faber. This is just the mistake which has been generally committed by American Authors.

I am enabled to state positively, from autoptical examination of the specimens themselves, that the bird referred to by Cassin, in the Proceedings of the Philadelphia Academy for June, 1862, page 327, as *Puffinus Kuhlii*, is really the *Adamastor cinereus*, Mihi. The specimens, three in number, collected by the North Pacific Exploring Expedition, are lying before me, and agree in the minutest particulars with the type specimen of Lawrence's *P. hæsitata*, (Ann. N. Y., Lyc. N. H., 1853) which is also Lawrence's *P. cinereus* (Birds Amer., 1858, p. 835,) which is *Adamastor typus*, Bp.

Description. In general *form* not unlike *P. major*, but rather more graceful, with slightly slenderer and weaker bill, comparatively longer wings and tail, etc. Bill scarcely if at all shorter than the head, just equal to the tarsus, moderately stout, compressed, higher than broad at the base; unguis only moderately strong and hooked; commissure and outline of inferior mandibular rami a little curved, the former most so; nasal tubes unusually abbreviated, measuring not over a fifth of the culmen, but elevated, inflated, medianly subcarinate, apically obliquely truncated, the nostrils subcircular in outline; wings moderately long, a little exceeding the tail; tail quite long, so much rounded as to be almost cuneiform, the central rectrices much elong-

ated; feet rather weak and slender, moderately compressed; tarsus shorter than the middle toe without the claw; outer toe and claw longer than the middle with its claw, tip of inner claw about reaching base of middle one; claws obtuse, little arched, more or less dilated on their inner edge.

Colors. The upper parts are of a light smoky gray, or very light brownish ash color, this color uniform on the crown and nape, interrupted on the back by the pure or grayish white margins of all the feathers, which margins are broadest on the scapulars, deepening on the wing coverts and tertials into deep grayish brown, and also losing the white margins. The rump is concolor with the rest of the back, but the upper tail coverts have successively more and more white until the longest and most posterior ones are almost wholly of this color, with only some central touches of grayish brown. The primaries are deep grayish or brownish black, with, however, large white spaces which occupy the basal half or two-thirds of their inner webs. The outer webs, and apices of the secondaries are deep grayish plumbeous; the greater part of their inner webs white. The entire parts of the bird, from the chin to the extreme tips of the under tail coverts are pure white, except some slight soupçons of grayish on the flanks. The under surfaces of the wings, except just along the edges, and the axillary feathers are pure white. The connection of the color of the upper parts with the white of the under, on the sides of the head and neck, is peculiar; there is no line of demarcation whatever, but as the color of the upper parts becomes lighter in tint, so it becomes gradually more and more nebulated and undulated with white, the admixture of the two having a marked and beautiful effect. The under eyelid is wholly white, the upper less completely so. The bill is yellowish, darker along the culmen, the unguis light horn color. The legs and feet are yellowish, the webs still clearer yellow; the claws flesh colored.

Dimensions.—Length of bill along culmen 1·90, along gape 2·60, from feathers on side of lower mandible to its apex 1·75; height at base ·70; width ·60; tarsus 1 90; middle toe and claw 2·50, outer do. 2·55, inner do. 2·50; wing from the carpus 12·75; central rectrices 5·50, exterior do 4·75.

The variations in size to which this species is subject, are entirely parallel with those of *P major*, detailed further on. The color of adult birds does not vary much, and that chiefly in the slightly different degree of clearness or obscurity of the upper parts. Younger birds, however, have the bill rather dusky than yellowish, and somewhat of a greenish or bluish tinge in the color of the feet. The upper parts are considerably darker than those of the adults, being rather more of a brownish plumbeous than of an ashy grayish tint.

PUFFINUS LEUCOMELAS Bp. ex Temm.

Procellaria leucomelas, Temminck, Planches colorées, No. 587.—Temm. et Schlegel, Fauna Japon. p. 131, fig. 85. Schlegel, Mon. Proc. Mus. Pays-Bas, 1863, p. 24. *Thiellus* sive *Nectris leucomelas*, Auct. aliq. *Puffinus leucomelas*, Bonap., Consp. Av. ii. 1856, p. 203.

With this species I am autoptically unacquainted, and therefore compile the following brief account from Dr. Schlegel's excellent Monograph, above quoted.

It is in general similar to *P. Kuhlii*, which it appears to replace in the Pacific Ocean. It is smaller, however, than that species, slenderer in general prorortions, and with a weaker bill. In color it is principally distinguished by having the feathers of the upper parts generally, and of the sides of the head and neck white, each with a brown longitudinal shaft line.

Length of wing from the carpus from $11\frac{1}{4}$ to 12 inches. Middle tail feathers $4\frac{1}{2}$ to $4\frac{3}{4}$ inches, external $3\frac{1}{8}$ to $3\frac{1}{2}$. Bill 22 to 23 lines; height at base 5 to 6 lines; width about the same. Nasal tubes $3\frac{1}{2}$ lines. Tarsus 21 lines; middle toe 23 to 25 lines.

Habitat.—Pacific ocean, particularly in vicinity of Japan.

PUFFINUS CREATOPUS Cooper (MSS.) Nov. Sp.

Diagnosis. *P. Puffini majoris* staturâ, nec ei coloribus perdissimilis; sed rostro multo breviore, crassiore, tubulis nasalibus inflatis; ferè omnino nisi ungue flavescente-carneo; pedibus brevioribus, gracilioribus, carneis; tectricibus caudæ superioribus et inferioribus ex toto brunneo-nigris; remigibus primariis spatio albo basin versùs interni pogonii carentibus.

Habitat.—South Pacific Coast of North America.

Specimen typicum et unicum in musæo Smithsoniano, (Catal. No. 31964,) ex insulâ "San Nicholas" prope Californiâ, a Chirurgio J. G. Coopero collectum. (Calend. Julii A. D. mdcccclxiii.)

Description.—Form:—Bill a little shorter than the head or tarsus, about two-thirds the middle toe and claw; the most robust of the Puffinecæ, being especially large and swollen at the base, where it is as wide as high. The culmen rises rapidly from the end of the nasal tubes to the strong, very convex and much curved unguis; the sides of the bill are considerably compressed beyond the nostrils. Commissure curved from the feathers to the unguis, the convexity looking downwards; outline of the inferior mandibular rami about straight. The basal tubes are very short, being hardly a fourth of the length of culmen; they are unusually elevated, turgid, and with a slight median furrow; very obliquely terminated; the nares are elliptical in outline. The feathers of the forhead run forward to form an acute angle on the median line. The tarsi are unusually weak and slender, though not very much compressed, and are shorter than the middle toe without the claw. The outer toe just barely exceeds the middle, but its claw is much shorter and weaker. The tip of the inner claw falls short of the base of the middle one. The wings are of the ordinary shape and dimensions, and have the usual proportionate length of the primaries. The tail is of much the same length and has the same amount of graduation of its lateral rectrices as in *P. major*.

Color.—The upper parts are of about the same shade of brown as in *P. major*, and the feathers have similar lighter margins, the head, however, having more decidedly a plumbeous cast. The upper tail coverts are entirely deep brownish-black, darker even than the rest of the upper parts, with no vestige of white. The inner webs of the primaries are entirely brownish-black to their very bases, with no indication of the white spaces which exist in *P. major*. On the sides of the head and neck, the color of the upper parts extends entirely round on to the chin and throat, having no distinct line of demarcation, but very gradually and insensibly becoming more and more mottled with white, until the latter becomes the predominating color; on the chin the plumbeous-black and the white are about equal in amount. The dark color does not extend further nor indeed so far on the sides of the breast as on the sides of the neck. The lower eyelid is pure white. The sides under the wings and the inferior surfaces of the wings are mottled with grayish-black and white in about equal amount. The long axillary feathers are entirely grayish-black, except just at their bases. The middle of the abdomen and the circumanal region are variegated with grayish-black and white. The under tail coverts are entirely fuliginous black, with somewhat of a grayish cast. The nasal tubes, the culmen and unguis of the bill are brownish-black; the rest of the bill light-yellowish flesh color. The legs and feet are entirely light flesh color. The claws are whitish with brown tips.

Dimensions.—"Length 19·00; extent of wings 45·00". (collector's label.) Bill along culmen 1·60; along gape 2·30; from feathers on side of lower mandible 1·50; height at base, ·60; width about the same; length of nasal tubes ·40. Wing from the flexure 12·50. Tail: exterior feathers 4·00, median 5·00; tarsus 2·10; middle toe and claw 2·65; outer do 2·50, inner do 2·10.

Comparison with allied species.—The present species is so very peculiar in

most of its features, that it intimately resembles no other with which I am acquainted. It may be well, however, to notice the points of difference between it and *P. major* which is the most nearly allied species. There is but little difference in size between the two birds, *creatopus* being only slightly smaller, and the color of the upper parts is about the same in each. *Creatopus* may be at once recognized as follows: by its much shorter, stouter bill, usually turgid and thick at the base, with its very short swollen nasal tubes, and light flesh-color, except along the culmen and unguis; by its shorter, slenderer flesh-colored feet; by its entirely brownish-black upper tail coverts; by the extension of the dark color of the sides of the head and neck, far round on the chin and throat without any distinct line of demarcation; by the absence of any white at the bases of the primaries, and by the unusual amount of grayish-black mottling on the sides, the under surfaces of the wings, the axillary feathers, and circumanal region.

The shape of the bill is more like that of the common Atlantic *Kuhlii*; and the nasal tubes are quite as short. But the bill of *creatopus* is much stouter, wider and more turgid at the base, and the unguis is much more rapidly decurved. The color is quite different, (compare descriptions.) The legs of *cinereus* are yellow; of *creatopus* light flesh-color. The differences in plumage are too obvious to require comparison; e. g. *cinereus* has pure white under tail coverts; *creatopus* brownish-black, etc.

I have been unable to find any description which can be considered as indicative of this species, which I believe to be hitherto quite unknown. It is exceedingly interesting, from its many peculiarities of form and color. It is particularly to be noted, that it is the only "bicolor" species, that is, dark colored above and mostly white beneath, which has flesh-colored legs; this coloration of the legs being hitherto only known to its extent among the fuliginous species composing the subgenus *Nectris*.

The type and only known specimen of the species was taken by Dr. J. G. Cooper, at San Nicholas Island, off the coast of California. Its precise range of habitat is as yet unknown. Accompanying the specimen was a note from Dr. Cooper, stating that it was a species unknown to him and probably new, and suggesting, in the latter event, the exceedingly appropriate name by which I have designated it.

PUFFINUS MAJOR Faber.

Procellaria puffinus, Kuhl, Monog. Proc. Beit. Zool, 1823, p. 146, pl. xi, fig. 10; et auct. al. aliq.; sed non Linn., Gmel., Lath., quæ *Puff. anglorum* Ray; nec Temm. quæ *Proc. cinerea* Cuv. (*Kuhlii* Boie.)

Puffinus major, Faber, Prod. Isl. Orn. 1822, p. 56. Bp. Consp. Av. 1856, ii. p. 203.—Lawrence, Birds N. A. 1858, p. 833.—*Procellaria major*, Schlegel, Mon. Proc. Mus. Pays-Bas, 1862, p. 27.—*Ardenna major*, Reichenbach, Syst. av. t. xiv, fig. 770.

Puffinus cinereus, Bonap. Syn. Bds. N. A. 1828, p. 370, No. 311. Audub. Birds Amer. 1844, vii. p. 212, pl. 456; et al. script. Americ; sed non Gmel.

Habitat.—Atlantic Ocean, especially its northern and temperate portion. Mediterranean Sea. Atlantic coast of Africa. Cape of Good Hope. Terra del Fuego. Not the Pacific Ocean?

Synonymy.—This species has been presented under a variety of designations. Some authors have thought with Kuhl, that it is the one referred to by Linnæus, Gmelin and Latham, under the name of *Procellaria puffinus*. Elsewhere, however, I have proven, I think, that such is not the case, but that *P. puffinus*, Linn., is a synonym of *P. anglorum* Ray.

The *Procellaria puffinus* of Temminck (loc. cit.) is not this species, nor yet the *anglorum* (although he presents it as the real Linnæan *P. puffinus;*) but on the contrary, it is the *P. Kuhlii*, Boie, as is evident from the description and the synonyms quoted. I am quite at a loss, however, to discover upon what

[April,

grounds Temminck asserts that the *P. puffinus*, Kuhl., and the *P. cinerea* Kuhl, are "le vieux et le jeune de la même espèce." Kuhl's descriptions certainly indicate the two different species; and his passable figures of their heads are distinct enough from each other. But if Temminck could stoutly maintain to the last that *P. fuliginosus*, Strickl., was the female of *P. major*, Fab. (!), it is the less to be wondered at that he should commit the error we are now discussing.

It is a little doubtful what species is referred to by Vieillot, Nouv. Dict. d'H. N. xxv, 1817, p. 421, under the name of "Le Pétrel-puffin, *Procellaria puffinus*, Lath." The dimensions given ("quinze pouces") appertain best to the *anglorum*; but the description is entirely that of the *P. Kuhlii*, which it is doubtless best to consider it. The *Procellaria puffinus* of Vieillot's Fauna Franç. 1828, p. 404, is undoubtedly the true *cinereus*.

Dr. Degland in his Ornithologie Européene, p. 363, gives a good description of this species under its proper name of *Puff. major*, but he is in error in citing as synonyms the *Puffinus cinereus*, Brisson, or the *Procellaria cinerea* Gmelin and Latham.

Description.—Form: Bill but very little shorter than the head or tarsus, stout and subterete at the base, then gradually more and more compressed to the strong, deep, much curved unguis. Nasal tubes straight, about a fourth the length of the culmen, somewhat dilated, the apertures widely separated, sub-elliptical. The culmen rises gradually with a slight but continuous concavity from the nostrils to the summit of the unguis. The commissure from the insertion of the feathers to the declination of the unguis is a long regular curve, whose convexity looks downwards. The outline of the inferior mandibular rami is nearly straight. The bill is about three times as long as it is high at the base, considerably less wide than high. The primaries are long, somewhat narrow, rather acutely pointed, the first longest, the second nearly equal, the rest rapidly graduated. The tail is long, being contained only about two and a third times in the wing from the carpus; so much rounded as to be almost cuneiform; the central rectrices projecting considerably, and the lateral being much abbreviated. The tarsus is as long as the middle toe alone, compressed as usual, but very stout and strong. The outer toe is as long or slightly longer than the middle, but the small size of its claw makes it fall short of the tip of the middle claw. The inner toe is unusually abbreviated, the tip of its claw falling far short of the base of the middle one.

Color.—Upper parts dark bistre brown; on the head inclining a little to plumbeous or grayish brown; on the tertials and rump the deepest; each feather of the back, rump, and wing coverts with a margin of lighter brown, which in freshly plumaged birds is so light as to be almost ashy white; on the head the color is uniform without any lighter margins, and it extends considerably below the eyes, just to the level of the gape, having a clear and distinct line of demarcation with the white of the throat. Posteriorly on the side of the neck the white reaches further round on the nape, and has a more indefinite outline. Backwards still on the sides of the breast, the dark color reaches farther down, encroaching on the white of that region. The upper tail coverts, especially the longest and most posterior ones, are mostly white, but with transverse rays or central spaces of brown. The primaries are brownish black, deepest on their outer webs; on their inner webs, towards their bases, gradually lightening till they become brownish white, or even nearly pure white, in freshly plumaged birds, especially on the innermost primaries. The under parts from chin to anus are white; this color interrupted on flanks by the more or less numerous, large, isolated, dark brown patches, which coalesce just over the flanks. The under surfaces of the wings are white, except just along their edges where they are mottled with brown; and the apices of the long axillary feathers are brownish. The under tail coverts are deep grayish

brown, more or less conspicuously tipped with whitish. The tail feathers are like the outer primaries. The bill is deep blackish horn. The outside of the tibiæ and the exterior toe are brownish; the rest of the feet including the webs yellowish flesh color.

Dimensions.—Total length 18.00 to 20.00 inches and hundredths; expanse of wings 43.00 to 45.00. Bill along culmen 2.00; from feathers on side of lower mandible to tip 1.75; depth at base .65, width .60; wing from the carpus 13.00; tail: central feathers 5.75; exterior do. 4.75; difference 1.00; tarsus 2.40; middle toe and claw 2.90; outer do. 2.75; inner do. 2.30.

Variations.—The differences in dimensions which this large species presents are so great that the above measurements can only be considered as an average; and individuals will be found considerably above and below the standard. The bills of various specimens, as well as the tarsus and toes, differ to the amount of two or even three tenths of an inch; the wings from the carpus three-fourths of an inch, or more, and the tail proportionally. The relative proportions, however, and the shape of these several parts appear to be pretty constant.

There also exist greater variations in color than are found in most of the species. The difference appears to depend chiefly upon age, or rather upon the age of the feathers themselves. Just after the moult, when the feathers are fresh and new, they are of a clear deep brown with a considerable of a plumbeous tinge, and their margins are exceedingly light colored, in fact almost white on the tertiaries, etc. With advancing age the feathers become more and more of a duller brown, much like that given by Audubon in his plate; the margins are broader, less deeply defined, and simply of a dull grayish brown. Constant characters, however, seem to be the uniformity in color of the feathers of the head, there being no light margins to them; the peculiar line of demarcation on the sides of the head and neck, and the partially white upper, and almost wholly dark under tail coverts. Audubon's plate of this species, otherwise excellent, is very wrongly colored as regards the bill and feet. The bright tints he gives them rather appertain to another species.

Notwithstanding these variations, the present species is so marked a one that it is not readily to be confounded with any other. Some small and light colored specimens look something like examples of *P. Kuhlii;* the exact differences between the two will be given under the head of the latter. From *P. anglorum*, its size and the color of the upper parts at once distinguish it. *P. obscurus* and its allies are too different to require comparison. *P. major* may always be recognized by the peculiar size and shape of the bill (carefully examine preceding description); by the lighter margins of the feathers of the upper parts; by the line of demarcation of the white and brown on the sides of the head, as above given; and by the colors of the under tail coverts and flanks, which are the reverse of those of *Kuhlii*, its nearest ally. However light the color of the upper parts may be, they never acquire the real ashy tint which is a distinguishing characteristic of the latter species; and the colors of the bill and feet are always conspicuously different.

This species has an exceedingly extensive range. It apparently inhabits the entire Atlantic Ocean, up to exceedingly high latitudes. Dr. Schlegel has specimens from points on the west coast of Africa and from the Cape of of Good Hope. A specimen before me from Terra del Fuego, collected by Mr. T. R. Peale, Naturalist of the U. S. Exploring Expedition, is identical with the common north Atlantic bird.

PUFFINUS ANGLORUM, Temm. ex Ray.

Procellaria anglorum, Raii Syn. 1713, p. 134, sp. 4. Temminck, Man. Orn. ii. 1820, p. 806. Schlegel, Mus. Pays-Bas, 1863, p. 28. *Puffinus anglorum*, Brisson, Ornith., 1760, vi. p. 131. Temminck, Man. Ornith. iv. 1840, p. 509. Bp. Consp. av., 1856, ii. p. 203. Lawrence, Gen. Rep. Bds. N. Amer., 1858, p. 834; et auct. recent. ferè

[April,

omnium. *Nectris anglorum*, Kuhl. Monog. Proc. Beit. Zool., 1820, p. 146, sp. 23.

Procellaria puffinus, Brünn., Orn. Bor., 1764, p. 29, sp. 119. Linn. Syst. Nat. i. 1766, p. 213; Gmel. S. N. i. 1788, p. 566. Lath. Ind. Orn. ii. 1790, p. 824; sed non auct. aliorum, quæ potius ad *Puff. majorem* spectat.) *Nectris puffinus*, Keys. et Blas. Wirb. Europ. i., 1840, p. 94.

Puffinus arcticus, Faber, Prod. Isl. Orn., 1822, p. 56, sp. 1. *Puffinus Baroli*, Bonelli; Bp. Consp. Av., 1856, ii. p. 204; (an = *P.* "*anglorum*, ex Mare Medit.;" an sub. *P. yelcuano* adducenda?) *P.* "*manksii*," aliq.

Habitat.—North Atlantic Ocean, at large.

This species, though so long known and so common, yet requires very careful investigation; both because its bibliography is somewhat extensive, and on account of its variations in size and color, which are so considerable that there has been much confusion concerning it. I will first examine into its synonymy, and then proceed to characterize the species beyond the probability of any further difficulty with its specific characters.

The *Procellaria puffinus* of Linnæus, Gmelin, and Latham, has been variously interpreted by modern authors. Most writers, including Kuhl and others, consider it as the bird which was afterwards named *P. major* by Faber. Temminck makes it equal to the *cinereus* of Gmelin. Bonaparte and Schlegel regard it as undoubtedly referring to the present species. An examination of the diagnoses of Linnæus, or Gmelin, or Latham,—particularly the latter,—will, I think, make it quite patent that the last is the only tenable view to take of the name. Such expressions as are found in e. g. Latham's notice, as "Pr. corpore suprà *nigro*, subtus albo" * * * "15 pollices longa," etc., can only be considered as referring to the *anglorum;* for they are totally at variance with the essential characters of the *P. major*. Moreover, Latham cites "*P. anglorum*, Raii, Syn." as a synonym of the species. Such being the case, I unhesitatingly accord with Bonaparte and Schlegel in their identification of the Linnæan *P. puffinus*. I am quite at a loss to understand upon what grounds M. Temminck makes the remark that "ni Linné ni Latham n'out connu cet oisean."

The first recognized classical notice of this species is that given in 1713 by Mr. Ray, under the name of *Proc. anglorum*. Brisson calls it *Puffinus anglorum;* it is indicated by Linnæus, Gmelin, and Latham as *Proc. puffinus*, with "*anglorum*, Ray," as a synonym. Temminck was, I believe, the first binomialist who adopted Ray's designation; he calling it in 1820 *Procellaria anglorum;* in 1840 *Puffinus anglorum*.

This species is also the *Proffinus arcticus*, Faber (l. c.), as is evident from his diagnosis. The reference of Faber's name *arcticus* to the *P. major*, as has been occasionally done, is quite erroneous. I have an indistinct recollection of having seen this species cited as *Procellaria* or *Puffinus* "*manksii*," but I cannot at present call to mind the reference.

A certain "*Puffinus Baroli*, Bonelli," is admitted as distinct by Bonaparte in his Conspectus, p. 204, and also in his Tab. Longip. in the Comptes Rendus. It is said to be somewhat smaller, lighter colored, and with a slenderer bill. Well acquainted as I am, however, with the variations in just these features which the *anglorum* frequently presents, I cannot discover sufficient grounds upon which to separate *P. Baroli* even as a distinct variety; but rather entirely agree with Dr. Schlegel in considering it as an undoubted synonym of *anglorum*, or at least of *P. yelcuanus*, which is the representative species in the Mediterranean Sea.

Bonaparte (Consp. ii. p. 203) inquires "quid *Proc. puffinus*, Kuhl, Mon. Proc. p. 146, sp. 22, t. xi., f. 10, ex Mediterraneo?" to which I would reply unhesitatingly that it is the *Puffinus major*, Faber. The description is entirely pertinent, and the figure much more readily recognizable as representing the head and bill of this species, than are many of the delineations of the work.

Description.—Form: —The bill, measured from the frontal feathers, is about three-fourths as long as the skull, rather more than two-thirds the tarsus. Its height at the base is just about equal to the width. Its height at the point of greatest convexity of the unguis hardly exceeds that at the middle of the culmen. The unguis is not very strong, its convexity only moderate. The commissure at first curves gently upwards, then still more gradually downwards for the whole length of the bill, and then is pretty strongly deflected along the edge of the unguis. The outline of the lower mandible is about straight to the unguis, a little concave thence to the tip. The length of the nasal tubes is a little less than a fourth that of the culmen. The outline of the feathers on the upper mandible is the segment of a perfect circle. The folded wings just about reach to the end of the tail. The second primary is nearly as long as the first, the rest successively more and more rapidly graduated. The tail is contained about two and a third times in the wing from the carpal joint. It is much rounded, the lateral rectrices all regularly graduated; the exterior just three-fourths of an inch shorter than the central pair. The tarsus is just as long as the middle toe without its claw. The external toe and claw is a little longer than the middle toe and claw. The tip of the inner claw falls short of the base of the middle one. The claws are all nearly or quite as broad as high, being much dilated on their inner edges.

Color: —The entire upper parts are of a deep lustrous black, with a soupçon of brownish, especially when the feathers are old and worn. On the front and sides of the head and neck the black has a grayish or plumbeous cast. This color extends on the sides of the head much below the eyes, in fact quite to the throat, but it is more or less marbled with white. The under eyelid is pure white, in marked contrast with the surrounding black. On the sides of the neck the white extends further round towards the nape; on the sides of the breast, on the contrary, the color of the back extends a considerable distance, it being of a decided greyish plumbeous hue, and gradually becoming more and more marbled with white till it entirely disappears. The primary quills are black, as are their shafts, their inner webs fading into dull grayish brown. The entire under parts, from chin to under tail coverts, are pure white, with the single exception of a few feathers just on the flanks, and of the outer webs of the exterior row of under tail coverts, which are plumbeous black. The under surfaces of the wings and the axillary feathers are pure white, with a slight marbling of blackish just along the bend of the wing. The caudal rectrices are like the primary quills; the inferior surfaces of their shafts grayish white. Bill deep greenish black, some part of the lower mandible yellowish. Part of outer side of tarsus, whole of outer side of exterior toe and the claws brownish black; rest of feet light yellowish, including the webs.

Average dimensions:—Bill along culmen 1.40; height at base .45; width about the same; along rictus 2.10; from feathers on side of lower mandible to its tip 1.40; wing from the carpal joint 9.25; tail: exterior feathers 3.25, middle 4.00; amount of graduation .75; tarsus 1.80; middle toe and claw 1.90; outer do. 2.00; inner do. 1.55. Total length about 14.00; extent of wings about 33.00

Variations.—As to dimensions, these are quite considerable. As usual among *Puffini*, the bill differs a good deal in absolute size, as well as in robustness, generally preserving its shape, however, quite contantly. The longest bill before me measured 1.50; the shortest 1.30, along culmen, with a corresponding difference in other dimensions. The wing from the carpal joint varies nearly half an inch, and the tail to a corresponding degree. The total length of tarsus and toes varies about a third of an inch. In color the species is more constant, the chief variation being in the greater intensity or more decided brownish tint of the black of the upper parts. Younger specimens have more marbling of the plumbeous black and white on the sides of the breast, the color sometimes reaching nearly or quite across the breast, or

even invading the throat. In immature individuals, also, the lateral inferior caudal tectrices may be more extensively hued with plumbeous black. They are never, however, so much darkened as is usual in *obscurus* or *opisthomelas*.

This species may be always recognized among its congeners by the following combination of characters: its peculiar dimensions (see above), joined to the very dark upper parts, this color descending far on the sides of the head and breast, leaving a conspicuously white under eyelid; the almost entirely white under tail coverts and the comparative shortness and characteristic degree of roundness of the tail.

This is so very distinct, and at the same time so well known a species, that it hardly requires comparison with any other. The features in which the *P. yelcuanus* differs from it will be pointed out under the head of the latter.

Puffinus Yelcuanus, Bp. ex Acerb.

Procellaria yelkouan,* Acerbi, "Bibliot. Ital., 1827, cxl., Agost. p. 294;" et "Bull. des Sciences Nat., 1829, xvi. p. 463. Schlegel, Monog. Proc. Mus. Pays-Bas, 1863, p. 29. *Puffinus yelkouan*, Bonaparte, Comptes Rend. Tab. Longip. , Id. Consp. Av. ii. 1856, p. 205.

Habitat.—More eastern portions of the Mediterranean Sea; especially in the Black Sea, and in the vicinity of the Bosphorus.

With this species, admitted by the majority of modern authors, I am acquainted only through descriptions. This is specially to be regretted, since authors are at variance regarding its characters and affinities, and are not even entirely agreed upon its specific validity. Bonaparte considers it to be the representative of *obscurus* in the Black Sea and vicinity, and says that it is smaller than that species (being only 10 inches in length) and has a slenderer bill. Dr. Schlegel, on the contrary, considers it as most intimately allied to *anglorum*, which it replaces in that locality. As far as I can judge from a careful study of published descriptions, I entirely agree with Dr. Schlegel in opinion. On comparing it with *anglorum*, Dr. Schlegel has found it to differ as follows: In the greater elongation of the point of the wing; in the color of the upper parts being lighter and rather tending to grey than black, as is also the color of the dark feathers of the crissum; and in the uniform deep gray of the lateral under tail coverts, these latter being, in *anglorum*, black on their outer, and white on their inner webs.

The following detailed measurements are given by the same author, taken from individuals coming from the Bosphorus, near Constantinople. They are to be compared with those of *anglorum*, already given on a previous page. Wing (from the carpus), 8·33 to 8·66 inches and hundredths. Tail, 2·40 to 2·60. Bill along culmen, 1·20 to 1·50; height, ·28 to ·33; width, ·40. Nasal tubes, ·16 to ·20. Tarsus, 1·66 to 1·80; middle toe, 1·58.

Puffinus obscurus, Vieill. ex Gmel.

Procellaria obscura, Gmel., Syst. Nat., i. pars ii. 1788, p. 559. Lath., Ind. Ornith., ii. 1790, p. 828, et auct. antiq. Vieillot, Nouv. Dict. H. N. 1817, xxv. p. 423. *Puffinus obscurus*, Bonap., Synop., 1828, p. 371. Vieillot, Gal. Ois., 1834, ii. p 230, pl. 292. Audub., Bds. Amer., 1844, vii. p. 216, pl. 458. et al, auct. recent. *Nectris obscura*, Kuhl, Beiträge Zool., 1820, p. 147, pl. xi. fig. 11. *Cymotomus obscurus*, Macgillivray, Man. Orn., 1844, ii. p.13. "*Puffinus l'herminieri*, Lesson," fide Bp. *Puffinus floridanus*, Musæi Beroliensis," fide Bp.

Habitat.—The warmer portions of the Atlantic Ocean, especially the Gulf of Mexico, and the coasts of the Southern United States; abundant in the Bahamas and Bermudas. Wanders as far north as New Jersey, and is accidentally found in Europe. Apparently replaced in the corresponding latitudes of the Pacific Ocean by my *Puffinus opisthomelas*.

For so long known a species, the present has remarkably few synonyms,

* I find this barbarous name variously spelled yelkouan, yelkuan, yelkoan, etc. I have seen fit to modify it insomuch that it may present somewhat of a classical aspect.

and its bibliography is as explicit as that of almost any of the eighteenth century species of the family. First indicated with tolerable accuracy in Linnæan times, the species has almost invariably been presented under its original and proper specific title, though referred successively to the genera *Puffinus*, *Nectris*, and *Cymotomus*. The names "*l'herminieri*" of Lesson, and "*floridanus*" of the Berlin Museum, which I quote upon the authority of Bonaparte, are the only specific synonyms which I have met with.

There is an unusual and remarkable discrepancy in the statements of various authors concerning the length of the species, different writers giving the dimension from as little as 9¾ inches to over 13. It is impossible that it should vary to this extent. I believe the average length is a little over eleven inches.

Audubon's description of this species is sufficiently pertinent, but the plate he gives is unusually poor, and by no means true to nature. The outline of the bill is exceedingly faulty; the line of demarcation of the dark and light colors along the side of the head and neck is by no means accurate, and the lower tail coverts are represented as entirely white. The exact insertion of the right tibia of the individual figured has always been to me, anatomically speaking, a puzzle.

Dr. Kuhl informs us, in the text, that figure 11 of plate ix. of his Monographie der Procellarien was intended as a representation of the bill of this species; which is fortunate, as otherwise it would be quite impossible so to identify it.

I am much surprised at the statement by Dr. Degland, (Ornithologie Européene, ii. page 366, published in 1849!) that "cette espèce est peu connue, et il n'est pas certain qu'elle est distincte de la précédente"—*P. anglorum!* This author's indication of the habitat of this species is vague, and leaves much to be desired.

M. Temminck (Man. Ornith., ii. p. 808) gives, under head of *P. obscurus*, an excellent description of this species, except that the dimensions are inaccurate, being far too small.* The exact measurements of both of Temminck's typical examples are given by Dr. Schlegel in his recent monograph of the Procellaridæ, (Mus. Pays-Bas, p. 30.) This author finds that one of the types is an example of *anglorum*, from the Mediterranean Sea, afterwards labelled by Temminck himself a *P. Baroli*, Bonelli; and that the other is a small, weak-billed specimen of the true *obscurus*, from the Atlantic Ocean. These facts, supported by the authority of one so well known for diagnostic acumen as Dr. Schlegel, are indicative of an imperfect acquaintance on the part of Temminck with the species he treats of under the name *obscurus*.

The species of *Puffinus* spoken of in a paper published by Dr. D. W. Prentiss and myself in the Annual Smithsonian Report for 1861, (p. 418, as having occurred at Washington, D. C., and doubtfully referred to as the *obscurus*, has since been definitely ascertained to be this species.

Description.—Form: The bill is rather small and weak, and considerably compressed, except just at the base. In length along the culmen it measures just about two-thirds the skull, and about three-fourths the tarsus. It is quite stout at the base, where the height very decidedly surpasses the width. The unguis rises rapidly and a little suddenly above the rest of the culmen, and is strongly convex in outline. The commissure, from the insertion of the feathers to the unguis, as well as the outline of the lower mandible as far as the unguis, is almost perfectly straight. The nasal tubes are short, being much less than a fourth the length of the culmen, but they are elevated and quite conspicuous, much more so than in *anglorum*. The wings barely reach, when folded, to the end of the long tail. The proportionate lengths of the primaries are the same as in most other species. The tarsus is just as long as the middle toe without its claw. The outer toe with its claw is just as long as the middle one with its claw. The top of the inner claw about reaches the

* "Longueur, "à peupres 10 pouces."

base of the middle. The tail is very long, exceeding that of *anglorum*, which is a much larger species. It is also so very much graduated as to be almost cuneate, the lateral feathers being relatively shorter than in any other species. The under tail coverts are very long, fully equalling the central rectrices.

Color.—The upper parts are of a hue quite different from that of *anglorum*, the black having every where a quite appreciable grayish or plumbeous tinge, and the borders of the feathers being still notably lighter, especially on the scapulars and tertials. The color is deepest on the rump and upper tail coverts; it is much restricted on the sides of the head and neck, not extending below the level of the eyes, and even there its borders are marbled with white. On the sides of the breast the dark color extends considerably more towards the median line, but it is of a very light plumbeous tint, and much variegated with white. *Both* eyelids are more or less white, and there is, moreover, an indication of a white superciliary streak. The remiges and rectrices are colored, as in *anglorum*. The under parts, from the chin *to* the under tail coverts, are white, as are the axillary feathers and inferior alar tectrices, the white only interfered with over the flanks by leaden black. The longest posterior under tail coverts are brownish black, as are also one or two rows of the exterior ones, the rest being white, with or without a plumbeous tint. Notice that in amount of white on the under tail coverts, *obscurus* is just intermediate between *anglorum* and my new *opisthomelas*. The bill is deep leaden blue, darker at the apex; the legs and feet colored, as in *anglorum*.

Dimensions.—Length of bill along culmen, 1·25; along rictus, 1·70; from end of nostrils to tip, ·90; from feathers on side of lower mandible to its apex, 1·20; its depth at base, ·40; width, ·35; depth at convexity of unguis, ·25. Wing, from the carpal joint, 8·00. Tarsus, 1·60; middle toe and claw, 1·80; outer do., 1·85. Central tail feathers, 4·25; exterior feathers nearly an inch shorter. Total length from tip of bill to end of tail about 11·00; expanse of wings about 25·50.

Variations.—I find the differences in size to be about the same, relatively to its dimensions, as in the other smaller *Puffini*, while, as usual, the general form and the proportion of parts are pretty constantly preserved. The characteristic hue of the upper parts is always recognizable, but the precise tint varies with the age of the feathers. The margins of the dorsal feathers are frequently very conspicuously lighter. The limit of the extent of the dark color on the sides of the head, neck, and breast, hardly differs notably, even with age, and is a strong specific character. The relative amount of the black and white on the under tail coverts is also pretty constant, being intermediate between *anglorum* and *opisthomelas*, as before stated. The unusual graduation of the tail is, I believe, always preserved in mature birds.

The combination in this species of its small size, the tint of the upper parts, and its characteristic line of demarcation with the white on the sides of the head, neck, and breast, together with the color of the under tail coverts, and the length and shape of the tail, renders it readily diagnosticable. As with *anglorum*, I have taken it as the standard in treating of the other closely allied; and the peculiar points wherein each differs from it will be found detailed under their respective headings.

PUFFINUS OPISTHOMELAS Coues, nov. sp.

Diag.—*P. Puffino obscuro* nec perdissimilis; sed major, rostro longiore, robustiore, alis pedibusque longioribus, caudâ breviore, minus rotundata; et tectricibus caudæ inferioribus ferè omnino fuliginoso-nigris.

Habitat.—South Pacific coast of North America.

Description.—Form: The bill is rather long, about four-fifths the tarsus, stout, moderately compressed, a very little higher than broad at the base, the unguis large and strong, its convexity great, and rising much above the level of the rest of the culmen, the depth of the bill at the point of the greatest

convexity of the unguis being much more than in its middle. The outline of the inferior mandibular rami is about straight as far as the unguis; the line of the commissure is considerably curved. The nasal tubes are large and prominent, and rather long for this group, being more than a fourth of the culmen; and the nasal apertures are much elongated, being very elliptical rather than circular. The frontal feathers extend forwards to a point on the median line instead of being the segment of a perfect circle, as in *anglorum* and *obscurus*. The folded wings reach beyond the tail. The tail is comparatively and absolutely much shorter than in *obscurus* and very decidedly less rounded, the difference between the middle and exterior rectrices being only about half an inch. The feet are as much longer than those of *obscurus* as is proportional to the greater size of the bird; the tarsus is as long as the middle toe and half its claw. The outer toe and claw equals the middle; the tip of the inner claw falls short of the base of the middle one.

Color.—The nasal tubes and culmen are blackish, the sides of the bill yellowish or reddish brown, the unguis mostly light bluish white. "The iris is dark brown," (collector's label.) The internal aspect, and part of the outer side of the tarsus, the middle and inner toes and the webs are light yellowish flesh color. The rest of the tarsus, the outer toe and the very margins of the webs are brownish black. The claws are brown. The entire upper parts, the wings and tail are of exactly the same shade of sooty black as obtains in *obscurus*, but with the following notable difference in the line of demarcation of the white on the sides of the head, neck and breast: the dark color is much more extensive, reaching as far below the eyes as it does in *anglorum*, and there is no definite union of the two colors; but as the dark takes on more and more of a lighter plumbeous hue, it insensibly becomes more and more nebulated with white. There is no white on either eyelid, nor any indication of a white superciliary line. The under wing coverts are white, as in *obscurus;* the bend of the wing rather more decidedly mottled with the color of the back. The axillary feathers are more or less blackish towards their ends instead of being pure white. The flanks are more extensively and decidedly fuliginous black than in *obscurus*. It is in the color of the under tail coverts, however, that the difference from *obscurus* is most apparent. These feathers are entirely of a deep fuliginous black, except a few of the shortest ones just posterior to the fundament, which are whitish.

Dimensions.—Bill along culmen 1·40, along commissure 2·00, from end of nasal tubes to tip 1·05, from feathers on side of lower mandible to its tip 1·40; height at base ·42, width a little less; height at convexity of unguis ·32. Wing from the carpus about 9·00. Tarsus 1·80; middle toe and claw 2·10. Tail 3·75; outer feathers ·60 shorter; (in *obscurus* tail 4·25; outer feathers nearly 1·00 shorter.)

Variations.—With but two specimens before me, I cannot speak so fully on this point as I could wish; but the variations are doubtless quite parallel in all respects with those of *anglorum* or *obscurus*. The above measurements indicate the average of the two specimens. They are precisely similar in colors.

Comparison with allied species.—This new species differs from *obscurus* as follows, briefly: In its larger size, as will be palpable from the measurements given of the bill, wings and feet.* In its both relatively and absolutely *shorter* tail, which is also much less rounded. In the different outline of the frontal feathers on the bill In the different coloration, insomuch that there is no white about the eye; that the dark color extends much further on the sides of the head and neck; and that the under tail coverts are almost entirely fuliginous black, instead of being for the most part white.

It is distinguishable at a glance from *anglorum* by its greatly inferior size,—

* The collector's label gives, "Total length 15 inches; expanse of wing 32;" but these cannot be implicitly relied on.

vide measurements; by the very different color of the upper parts; and by the fuliginous black instead of white under tail coverts.

The *Puffinus yelcuanus* is lighter colored above than is *anglorum*, and therefore this species approaches it in this respect. But *yelcuanus* is much larger than the present species, and has white under tail coverts like *anglorum*; so that it is impossible to confound it with *opisthomelas*.

Still more different is this species from the *P. nugax*, Solander, from the Australian seas. This latter is a very diminutive species, much smaller even than *obscurus*, the wing being only about 6½ inches from the carpus. It also has the white of the throat extending far up on the sides of the head and neck, and white under tail coverts; characters diametrically opposed to those which obtain in the present species.

I am acquainted with no other species to which the present bears any sort of resemblance. I trust that I have so fully and correctly indicated its characters and relationships, that its introduction, even into this peculiarly intricate group, will be the cause of no confusion or uncertainty regarding it.

Two fine examples are contained in the Smithsonian Museum, both collected by Mr. John Xantus at Cape St. Lucas, Lower California. (Smiths. Catalogue, Nos. 16,990, 16,991.)

PUFFINUS NUGAX (Solander.)

Procellaria nugax, Solander, Schlegel, Mon. Proc. Mus. Pays-Bas, 1863, p. 31. *Puffinus nugax*, Bonaparte, Consp. Av., ii. 1856, p. 205.

Puffinus assimilis, Gould, P. Z. S., 1837, v. p. 156. Id. Ann. et Mag. N. H. xvi. Id. Birds Aust., vii. pl. 56.

"*Procellaria australis*, Eyton," (Bp.)

Habitat.—Australian seas.

A fine suite of this well marked species is in the collection of the Philadelphia Academy. Its relationships are closest with *P. obscurus*, but the differences are sufficiently obvious on comparison. It is the very smallest known species of *Puffinus*, being appreciably less than the *obscurus*. It is hardly 10·50 inches in length; the wings from the carpus only about 6½; th tail averages 2·75; the bill about one inch; the tarsus 1¼; the middle toe about the same. The color of the upper parts is about the same as in *P. obscurus*, or a very little lighter; the feathers generally with appreciably darker tips. A striking diagnostic feature is found in the extent to which the white of the under parts mounts up on the sides of the head and neck, which is greater than in any other species. The inferior caudal tectrices are usually entirely pure white. The under surfaces of the wings are pure white, and the inferior aspect of the inner webs of the primaries are dull whitish, being much lighter than are these parts in *obscurus*. The bill is dusky horn color. The tarsi are greeenish yellow; the webs bright chrome yellow.

The preceding paragraph shows the points in which the species differs from *obscurus*. It is too distinct from *anglorum* or *yelcuanus* to require comparison. It cannot be confounded with my *P. opisthomelas*, since the latter is nearly as much larger than *obscurus* as *nugax* is smaller; has the coloration of the sides of the head and neck very different, (compare descriptions;) has black instead of white under tail coverts, etc.

I have not an opportunity of examining the original description of *nugax* by Solander, but all authors agree that it is the species subsequently named *assimilis* by Gould. I do not know where the species is called *australis* by Eyton, but quote the name on the authority of Bonaparte.

Analytical Synopsis of the Genera and Species of PUFFINEÆ.

Family *PROCELLARIDÆ*.

Subfamily PROCELLARINÆ.

Section PUFFINEÆ.

Char.—Tail of twelve much graduated feathers. Bill long, compressed,

much hooked, the outline of the unguis of the lower mandible concave, decurved. Nasal tubes short, broad, flattened, apically usually very obliquely truncated; in length usually a fourth of culmen; the internasal septum broad. In color either entirely fuliginous, or cinereous, or brown above and white beneath; never glaucous or bluish, or with parti-colored primaries. "Shearwaters."

I. MAJAQUEUS Reich.

The very short tail only a fifth of the total length. Bill unusually stout for this section; nasal tubes approaching in character those of Fulmareæ. Very large; fuliginous, with peculiar facial markings.

1. M. ÆQUINOCTIALIS Reich.

Pr. æquin. L. *Priofinus æquin.* Homb. et Jacq. *Pr. nigra,* Forst. *Puff. capitis bonæ-spei,* Briss.

Tarsus $2\frac{1}{4}$ inches; ungues of bill yellow; a submental white spot.

2. M. CONSPICILLATUS Bp.

Proc. conspicillatus, Gould. *Pr. larvata,* Less.

Larger; bill more robust; its unguis bluish black; tarsus $2\frac{1}{3}$; usually a white submental spot; a lateral stripe on sides of head, and a transverse one across the vertex before the eyes.

II. ADAMASTOR Bp.

Bill and nasal tubes identical with those of *Majaqueus.* Tarsus much less than middle toe without claw. Tail very short, much graduated. Bi-color; above cinereous, below white.

3. A. CINEREUS Coues.

Proc. cinerea, Gm. (non Cuv., Kuhl., Temm., Schleg., Degl., Schinz., Keys. et Blas. quæ *Puff. Kuhlii,* Boie; nec Aud., Mitt. quæ *Puff. major,* Fab.) *Puff. cinereus,* Lawrence, 1858. *Adamastor cinereus,* Coues, 1864. *Proc. hæsitata,* Forst., Gould, Reich. (non Kuhl, Temm., Newton, quæ *Astrelata diabolica*) = *Puffinus hæsitata,* Lawr., 1853. *Puff. Kuhlii,* Cass. [1862] nec Boie. *Proc. adamastor,* Schleg. *Adam. typus,* Bp.

Bill yellow, nasal tubes, culmen and sulcus on lower mandible black; above with under surface of wings and tail cinereous; below white; 19 inches long; bill 1·80, wing 13·00, tail 5·75, tarsus 2·40, middle toe and claw 2·90.

4. A. GELIDUS Coues.

Proc. gelida, Gm., Lath., Vieill. *Proc. flavirostris,* Gould. *Adamastor flavir,* Bp.

Above brown, with paler edges to the feathers; wings and tail deep blackish brown; below, including the under surfaces of wing and tail, white, the feathers of the former with a brown longitudinal streak; bill yellow, its tip dark; 19 inches long, wing 15, tail 6·50, middle toe and claw 3·15.

5. A. SERICEUS Bp.

Puff. sericeus, Lesson.

Bill black; above grayish ash, deeper on the wing coverts; below white; 15 inches long, wing 11·50, tail 5, tarsus 1·75, middle toe 1·33.

III. THIELLUS Gloger.

Generally like *Nectris,* but tail unusually long and cuneiform, being nearly or quite half as long as the wing from the carpus.

6. T. SPHENURUS Bp.

Bill flesh color, tinged with brown, darker on culmen and unguis. Length 15 to 16 inches, wings about 11, bill 1·60.

7. T. CHLORORHYNCHUS Bp.

Bill greenish orange, black on culmen and at tip. Bill 1·85; stouter than in *sphenurus,* a little larger than that species, but the wing usually shorter, ($\frac{1}{2}$ inch or more.)

IV. NECTRIS Bp. (emend. Forst.)

Size moderate; unicolor, fuliginous; feet pale; bill long, slender, much hooked; nasal tubes short, flat, very obliquely truncated; tail long, rounded; tarsus about equal to middle toe without claw, (vix nisi colore fuliginoso genere *Puffino* differre videtur!)

8. N. FULIGINOSUS Keys. et Blas.

Puff. fuliginosus, Strickl. et auct. (sed non *Proc. fuliginosus*, Gm., Lath., Vieill., quæ species "*Thalassio*;" nec Banks, [tab. 19;] nec Kuhl, [sp. 12] quæ *Pterodroma atlantica*, Gould.) *Puffinus major* fœm! Temm. *Puff. cinereus* fœm! Gould.

Bill concolor with plumage; feet brownish black, internal face of tarsus and the webs dusky yellowish. Length 18 inches, wing 12, bill 2·00. North Atlantic.

9. N. AMAUROSOMA Coues, nov. sp.

Bill concolor with plumage; feet fleshy white, outer side of tarsus and outer toe tinged with dusky; inferior wing coverts mostly white; wing 11 inches, tail 4·25, bill 1·70. Pacific coast of N. Amer.

10. N. CARNEIPES Bp.

Puff. carneipes, Gould. *Proc. carneipes*, Schlegel. *Majaqueus carneipes*, Reich. "*Puff. cinereus*, juv. Smith." "*Nectris gama*, Bp."

Bill fleshy white, culmen and tips dusky; legs, feet and membranes yellowish flesh color. Length 15 inches; length of bill, feet, wings, tail, much the same as *fuliginosus*. Australian seas.

11. N. TENUIROSTRIS Bp.

Proc. tenuirostris, Temm. *Puff. tenuirostris*, Temm. et Schleg. "*P. curilicus*, *P. tristis*, Musæorum."

Very small; bill excessively weak and slender; wing 10 inches, tail 3·50, bill 1·20, tarsus 1·90. Bill dusky greenish yellow; feet yellowish; posterior edge of tarsus and under surface of webs blackish. White under wings as in *amaurosoma*. Japan.

12. N. BREVICAUDUS Bp.

Puff. brevicaudus, Brandt. *Majaqueus brevicaudus*, Reich.

"Blackish fuliginous, lighter beneath; bill black, yellowish at base; feet cinereous, webs yellow." (Bp.) "Australian seas." Gould, [species mihi ignota.]

V. PUFFINUS Briss.

Moderate and small in size, bicolor, above brown or cinereus, below white. Wings very long and pointed; tail long, rounded. Feet very large; tarsus shorter than middle toe and claw; bill long, rather slender, compressed, hooked; nasal tubes short, flat, obliquely truncated; nasal septum broad, nostrils oval.

13. P. KUHLII Boie.

Proc. puffinus, Temm., Vieill. [1828]; et al, auct. Europ.; sed non Linn., quæ *P. anglorum*, Ray. *Proc.* sive *Puff. cinereus*, Cuv., Temm., Kuhl., Schleg., Degl. et al. auct. Europ. ferè omnium; sed non Gm., Lath., Vieill., Lawr. quæ *Adamastor cinereus*, Mihi; nec Aububon et auct. Amer. quæ *P. major*, Fab.

Bill yellow, its nasal tubes more elevated, compressed and vertically truncated than usual in this genus. Above light brownish ash or cinereous, each feather with a lighter margin, nebulated and undulated with pure white on sides of head and neck; posterior upper tail coverts and whole under parts, including under surfaces of wings and *all* the under tail coverts, pure white. Tail almost cuneiform; feet weak and slender, yellowish; outer toe and claw longer than middle do. North Atlantic Ocean only.

14. P. LEUCOMELAS Bp.

Proc. leucomelas, Temm.

Smaller than *P. Kuhlii*; weaker bill. Feathers of the upper parts and sides of head and neck grayish white, each with a longitudinal shaft line of brown.

15. P. CREATOPUS Cooper, n. sp. [in epistolis.]

With the general aspect of *P. major*. Bill short, usually swollen and stout at the base, nasal tubes elevated, turgid, short. Bill yellowish flesh color. Nasal tubes, culmen and tip blackish. Feet light flesh color! Upper parts generally as in *P. major*, but *no* white on upper tail coverts; no white at bases of primaries; the color of sides of head extending round on the throat, with no dividing line; and the under tail coverts entirely fuliginous black. Bill along culmen 1·60; height at base ·60.

16. P. MAJOR Fab.

Proc. puffinus, Kuhl, et auct. al. aliq. Europ. (sed non Linn., Gm., Lath. quæ *P. anglorum*, Ray; nec Temm. quæ *Kuhlii*, Boie.) *Puff.* sive *Proc. major*, Auct. *Ardenna major*, Reich. *Puff. cinereus*, Bp. [1828.] Audub., Nutt. non Gm.

Above smokey brown, the feathers with lighter edges. Posterior upper tail coverts mostly white. A definite line of demarcation between the brown and white on the sides of the head and neck. Length 18 to 20 inches; bill 2, wing 13, tarsus 2·40.

17. P. ANGLORUM Temm.

Proc. anglorum, Ray. *Puff. anglorum*, auct. *Proc. puffinus*, L., Gm. Lath., Brünn. sed non al. auct. quæ *P. major*. *Nectris puffinus*, Keys. et Blas. *P. arcticus*, Fab. *P. Baroli*, Bonelli.

Tarsus equal to middle toe without claw. Bill about two-thirds the tarsus, along culmen 1·40 inches; wing 9·25. Above very deep lustrous brownish black,—darker than in any other species.

18. P. YELCUANUS Bp.

Proc. yelkuan, Acerbi.

From the Mediterranean Sea. Like *P. anglorum*, but lighter colored above, the point of the wing more elongated, and lateral under tail coverts uniformly deep grey.

19. P. OBSCURUS Vieill.

Proc. obscurus, Gm. *Proc.* sive *Puff. obscurus*, auct. *Nectris obscurus*, Kuhl. *Cymostomus obscurus*, Macgill. *Puff. l'herminieri*, Less. *P. floridanus*, Mus. Berol.

Bill three-fourths as long as the tarsus. Tail very long, much graduated. Above grayish, or plumbeous black, not extending on the sides of the head below the eyes. Axillary feathers white. Longest posterior under tail coverts brownish black, rest white. Bill 1·25, wing 8, tail 4·25, exterior rectrices an inch shorter. Tarsus 1·60; middle toe and claw 1·80—inches and hundredths.

20. P. OPISTHOMELAS Coues, nov. sp.

From Cape St. Lucas. Generally like *P. obscurus*, but larger, with a longer bill and wings, a shorter, less graduated tail; almost all the under tail coverts and axillary feathers fuliginous black, and a different line of demarcation between the color of the upper and under parts on the sides of the head and neck. Bill 1·40, wing 9, tarsus 1·80, middle toe and claw 2·10, tail 3·75, outer rectrices only ·60 hundredths of an inch shorter.

21. P. NUGAX Bp.

Proc. nugax, Solander. *Puff. assimilis*, Gould. "*Proc. australis*, Eyton."

From the Australian seas. Smallest of all; wing only 6½ inches, tail 2¾, bill one inch, tarsus 1¼. The white of the under parts mounts high up on the sides of the head. Under tail coverts entirely white. Under surfaces of inner webs of primaries dull whitish.

Well known as a bird of Chili and other countries of Western South America. In this species the under wing coverts are white, and the fine scarlet of the throat and breast extends over the abdomen.

Numerous specimens in the Academy Museum, and in Museum Smithsonian Institution.

7. STURNELLA LOYCA, (Molina.)
Sturnus loyca, Mol., Dizz. Stor. Nat. Chili, (1782,) 2d ed. p. 212, (1810.)
Sturnella bellicosa, De Filippi.
Pezites brevirostris, Cab., Mus. Hein., p. 191, (1850.)
Leistes albipes, Philip. et Landb. Trosch. Archiv., 1863, p. 128?

This is apparently a smaller bird than the preceding, with a shorter and thicker bill, and the scarlet of the under parts is restricted to the throat, neck and breast, not extending on the abdomen as in the preceding. One fine apparently adult specimen now before me has the *tibiæ* clear white on their inner surfaces, mottled with black on their outer, in which plumage it seems to be *Leistes albipes*, Philip. et Landb., as above cited. The under wing coverts are white, as in the preceding.

The synonymy of this species I find to be difficult, but it is not improbable that it was first described by Dr. Cabanis as above cited, authors to the contrary notwithstanding. Specimens in Mus. Acad.

8. STURNELLA DE FILIPPII, (Bonaparte.)
Trupialis defilippii, Bonap. Consp. Av. i. p. 429 (1850.)

Easily distinguished from either of the two preceding by its black under wing coverts. Specimens from Brazil in Museum Academy.

3. *Amblyramphus.*

(Genus Amblyramphus, Leach, Zool. Misc. p. 81, 1815.)

9. STURNELLA HOLOSERICEA, (Scopoli.)
Xanthornus holosericeus, Scop. Flor. et Faun. Insub. p. 88, (1786.)
Oriolus ruber, Gm. Syst. Nat. i. p. 388, (1788.)
Amblyramphus bicolor, Leach, Zool. Misc. i. p. 82, (1815.)
Sturnus pyrrhocephalus, Licht. Verz. Doubl. p. 18, (1823.)
Sturnella rubra, Vieill. Ency. Meth. ii. p. 635, (1823.)
Leistes erythrocephalus, Swains. Cab. Cy. Birds, ii. p. 275, (1837.)
Leach. Zool. Misc., i. pl. 36.

Numerous specimens of this apparently common species are in the Academy Museum from Brazil. Easily recognized when adult, by its brilliant scarlet head, and tibiæ and black body. The young is nearly uniform dull black, the scarlet generally first appearing on the throat and forehead.

This species ends the subfamily *Agelaiinæ*, but I am not quite confident that the genera or subgenera *Creadion*, Vieillot, and *Amblycercus*, Cabanis, do not belong here. Such may be the case also with *Hypopyrrhus*, Bonaparte. At present, however, my impression is, that all of these have greater affinities in other groups of the family *Icteridæ*.

A Critical Review of the Family PROCELLARIIDÆ:—Part III; embracing the FULMAREÆ.

BY ELLIOTT COUES, A. M., M. D.

[Continued directly from page 144 of these Proceedings for 1864.*]

The *Fulmareæ*, as I would define them, form a group of the *Procellarinæ* represented as far as is now known by only three genera. These are *Fulmarus*, *Thalassœica and Ossifraga*; all closely allied in general form and propor-

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*The writer's protracted residence in Arizona, where books and specimens were alike unattainable, has unavoidably delayed until now the continuation of the series of papers begun in 1864. Efforts will now be made to finish the subject.

tions, though presenting considerable diversity in coloration. The genus *Adamastor* which has been placed among the Fulmars by Bonaparte, seems, as I have attempted to show in a previous paper,* to fall most naturally among the *Puffinæ;* being not widely separable from *Majaqueus*, which Bonaparte himself (Consp. Av. ii. p. 200) places among the Shearwaters. The position of the somewhat anomalous genus *Daption* is a little uncertain; possessing, as it does, some of the characteristics of the present group. I am of opinion, however, that it is most naturally to be included with the *Estrelateæ*, under which section I shall hereafter consider it.

The section *Fulmareæ* then, as thus constituted, is composed of large or moderate sized species, having a form very stout, compact, and robust, and being nearly always very light colored. It is apparently the section of Petrels most closely allied to the *Laridæ*, and forming the connecting link between the two families. Particularly in the genus *Thalassoica* is the Laridine aspect very marked.

The bill is always large and robust. The unguis of the upper mandible is strong, very convex in profile, and much hooked at the extremity. That of the lower mandible is never much attenuated nor decurved, with the outline of the gonys decidedly concave; but is short, stout, obtuse, with a straight ascending gonys. The nasal tubes are prominent, wide, long, vertically truncated, usually emarginated at their end; the nasal septum very thin and delicate. The wings are of moderate length, reaching when folded about to the end of the tail; the primaries are very broad. The tail is short; more or less rounded; of 14 to 16 feathers, all of which are broad and subtruncated at their extremities. The feet are comparatively small and weak. The tarsus is slender, compressed, reticulated, shorter than the middle toe. The outer toe is as long or longer than the middle one. The tip of the inner claw about reaches to the base of the middle.

Of the three genera which I regard as the components of this section, *Ossifraga* has 16 rectrices, while *Fulmarus and Thalassoica* have but 14. Of *Fulmarus* we at present know three species; of *Thalassoica*, two; while *Ossifraga* has but a single representative. The section is cosmopolitan.

FULMARUS Leach.

Procellaria sp., Auctorum; nec Linn.

Fulmarus, Leach, Stephen's Gen. Zool. 1825, xiii. p. 233. Type *Proc. glacialis* L.

Rhantistes, Kaup, Sk. Ent. Eur. Thierw. 1829, p. 37. Same type.

Gen. Char. Bill about two-thirds as long as the head, three-fourths as long as the tarsus; short, very stout, exceedingly robust at the base, where it is higher than broad; the lateral laminæ of the upper mandible especially large, and swollen; the unguis short, very stout, convex in outline, commencing to rise almost from the nostrils; commissure greatly curved; the outline of inferior mandibular rami a little concave; the gonys ascending; the sulci of both mandibles deep and distinct; the nasal tubes long, nearly half the culmen, prominent, inflated, their dorsal outline about straight, their apex emarginate, vertically truncated; the nasal septum very thin. Wings of moderate length; reaching when folded about to end of tail; the primaries very broad at their bases, somewhat rapidly tapering to their rounded tips. Second primary nearly as long as the first. Tail of 14 rectrices, all broad, subtruncated; the lateral ones somewhat graduated. Feet rather small and weak; the tibiæ exposed for a short distance; the tarsi slender, moderately compressed, about three fourths as long as the middle toe and claw. Outer toe and claw about equal to middle toe and claw; the toe alone longer than the middle without its claw. Inner toe very short, the tip of its claw barely reaching to the base of the middle claw. Hallux short, only observable as a stout obtuse subconical claw.

* *Vide* Pr. A. N. S. Ph. for April, 1864, p. 117.

Large in size, and very robust in form. Colors white and light pearl blue, with darker primaries.

As above defined, the genus *Fulmarus* is restricted to its type *glacialis*, and the two other closely allied species *pacificus* and *Rodgersii*.

As is the case with all the genera of the family, the name *Procellaria* has been applied to the present genus. As I have already indicated,* I consider *P. pelagica* and its congeners as typical of the genus *Procellaria*. *Fulmarus* appears to be the first distinctive appellation of the present group; having priority over *Rhantistes* of Kaup.

The type of this genus is subject to variations in size, etc., remarkable even in this variable family. In consequence, several races or varieties have been described and named; which I think are properly to be included under *glacialis*. I recognize as valid the three following species.

Fulmarus glacialis (Linn.) Steph.

Procellaria glacialis, Linn., S. N. 1766, p. 213; et auct. nec Pall., nec Forst.
Fulmarus glacialis, Stephens, Gen. Zool. 1826, xiii. p. 234, pl. 27. Bonaparte, Consp. Av. ii. 1856, p. 187; et al. auct. recent.
Fulmarus glacialis, var. *Audubonii*, Bonaparte, Consp. Av. 1856, ii. p. 187.
Fulmarus glacialis var. *minor*, Bonaparte, Consp. Av. 1856, ii. p. 187.
"*Procellaria minor*, Kjærb," fide Bp.
"*Procellaria hyemalis*," Brehm.

Habitat. North Atlantic Ocean.

This species has served as the basis of so many nominal species, caused by its great variations, that, although no description of it is needed, it may be well to notice the differences to be found whenever large series are compared.

Examination of numerous specimens convinces me that the differences in *color* are those of age and season chiefly if not wholly; since the species passes very gradually from the uniform dull greyish brown of youth to the pure white and pearly blue of the adult condition. There do not seem to be any very well defined stages during this transition. Birds of the year, before the autumnal moult, are entirely fuliginous gray, lighter beneath, with darker margins to the feathers of the back and wing coverts. The tail is about concolor with the rest of the plumage. There is an angular anteocular black spot. The bill and feet are of a dull yellowish or ashy brown. After the moult, the pearly blue of the back extends upon the nape and head; (just as it does in *Rissa tridactyla*;) and the upper tail coverts, and the rectrices are of the same color. The primaries are colored the same as in the mature bird. Spring and summer adults have the pearl blue restricted to the back and wing coverts; other parts of the body being pure white. The distribution of colors is then just as in *Larus canus*, *argentatus*, etc. The dark anteocular spot however seems permanent. The bill is wholly yellow; the feet yellow with a bluish tint.

The variations in *size* are carefully to be noted; since, taken in connection with a varying length and robustness of bill, they have given rise to nominal species. The average length appears to be about 16·5 inches; there is however a margin of one or even two inches both above and below this standard to be allowed. The wing measures from the carpal joint to the tip of the longest primary, from rather less than 11 to 12·5 inches. The average length of the bill (chord of the culmen) is 1·5; but it may be 1·33 or 1·66, with a corresponding difference in robustness. Young birds are always weak-billed. The tail ranges from about 4 to about 5 inches. The average of the tarsus is about 2 inches: of the middle toe without its claw, 2·25; both varying to the extent of a fourth of an inch or rather more. The feet however as a general rule differ less in dimensions than other parts.

The synonomy of this species is very brief and uninvolved; the points re-

* Proc. A. N. S. Philad'a. March, 1864, p. 79.

quiring considerations being hardly more than those relating to the varieties or supposed species which have been separated from it.

I have before me a rather small and weak-billed specimen from Greenland, which appears to be an example of what was called *P. minor* by Kjærb, or *P. glacialis* var. *minor* by Bonaparte. It has no claim that I can discover to be considered as even a variety; as the difference in size from the ordinary standard is by no means unusual. In the var. *Audubonii* of Bonaparte—based upon the bird used for the figures in Audubon's works—there is exhibited a by no means unusual variation in size, or in strength of bill.

While I would thus consider the Atlantic Fulmars as representing but a single species, nothing that I have found in an extensive series tends to invalidate the claims of *F. pacificus* to specific distinction.

FULMARUS PACIFICUS (Aud.) Lawr.

Procellaria glacialis, Pallas, Zoog. Rosso-As. ii., 1811, p 312.. Sed non Linn. nec auct.

Procellaria pacifica, Audubon, Orn. Biog. v. p. 331. Id Bds. N. Amer. vii. 1844, p. 208.

Procellaria (*Fulmarus*) *pacifica*, Lawrence in Baird's B. N. A. 1858, p. 826.

Fulmarus glacialis var. *pacificus*, Bonaparte, Consp. Av. ii. 1856, p. 187.

? *Procellaria glacialis* (*juniores*), Kuhl, Beit. Zool., 1823, p. 141.

This species, though very closely allied to *glacialis*, and requiring a rather careful comparison to distinguish it, yet appears to differ by constant characters. It is nearly or quite as large as that species; but the feet are, perhaps, a little shorter and weaker. There seems to be a constant difference in the shape of the bill; which, though not much shorter, is considerably weaker, more compressed, and more attenuated and decurved at the tip. The inferior mandibular rami divaricate at a more acute angle. But I have not been able, in examining quite a large series, among which is one of Audubon's types, to find any distinctive characters in the nasal tubes; the dorsal outline of which does not appear to be straighter than that of the Atlantic bird. In fact, one example of *pacificus* has a more concave tube than one of *glacialis*, now before me; nor can I discover that the carination of the tubes is more marked in one species than in the other. One example of *pacificus* shows no trace of any carination.

Some features of coloration are, perhaps, most distinctive of this species. The upper parts are much darker in *pacificus* than in *glacialis*; inclining to a bluish cinereous rather than a pearly blue. The rump and upper tail coverts, in lieu of being nearly pure white, are concolor with the middle of the back, or even darker than it. The bend of the wing, and the secondaries and tertials are somewhat deeper-colored than those of *glacialis*. The bill is bright yellow, lightest on the unguis: the root of which latter is bluish horn-colored. The feet are bright yellow, only slightly obscured on the outer aspect of the tarsus, and on the outer toe. The anteocular spot is smaller and more indistinctly marked than in *glacialis*.

Young birds have the yellow of the bill obscured by brownish or greenish, the unguis especially being quite dark, as are also the feet and toes. The entire plumage is fuliginous grayish brown; deepest on the side of the head; lighter on the under parts of the body, where there is considerable of a smoky cinereous tint. Most of the feathers of the upper parts have cinereous or pearly tips. Some of the tertials are more or less distinctly tipped with grayish white. The remiges and rectrices are brownish black; the former lightest, inclining towards their tips to grayish. The primary shafts are light brown, deepening in color at their apices. The under surfaces of the primaries are cinereous gray.

I thus detail the differences I have been able to find between the two supposed species, considering them as sufficient to establish a species; though

[March,

with equal reason they might be held as indicative of the extreme of variation of a single changeable type, and thus forming only a local race or geographical variety.

The *Procellaria glacialis* of Pallas in all probabilty refers to this species rather than to the true *glacialis* of Linnæus. I also think that the "*Procellaria glacialis*, juniores ex Americâ Septentrionali allatæ, colore cinerascenti-fuliginoso tinctæ" of Kuhl's "Beitrage," p. 141, belongs here rather than to the *Thalassoica glacialoides* to which Dr. Schlegel has referred it.

Fulmarus Rodgersii Cassin.

Fulmarus Rodgersii, Cassin, Cat. Birds North Pacif. U. S. Expl. Exped., in Pr. A. N. S. Ph. 1862, p. 290.

Habitat.—North Pacific Ocean.

I have before me Mr. Cassin's original and type specimen. With exactly the size and very nearly the form of *F. glacialis*, it differs from the latter very decidedly in color, as will be seen by the following comparative description:

The bill is bright yellow, except the base of the unguis of the upper mandible, which is bluish black. The middle of the back, the scapular feathers and some of the lesser wing coverts are a rather dark grayish ash, approaching the hue that is most distinctive of *pacificus*. The rump and upper tail coverts are pure white. The rectrices are fuliginous grayish ash; their inner webs and their extreme apices whitish, their shafts wholly yellowish. The whole of the tertials and the greater wing coverts are pure white; the lesser wing coverts and edge of the wing of the same color, but marbled with the ashy hue of the back. The secondaries are white with yellow shafts; the terminal half of their outer webs grayish brown. The primaries are dull brownish black, their entire shafts yellow, their inner webs to within an inch of their tips white. These markings of the primaries are much like those of *Thalassoica glacialoides*. All the rest of the body is white. The legs and feet are bright yellow; the outer aspect of the tarsus, and the outer toe somewhat obscured by dusky. The nails are ochraceous brown.

Bill along chord of culmen 1·50 inches and hundredths; from feathers on side of lower mandible to its apex 1·40; nasal tubes ·60; height of bill at base ·80; width about the same; wing from the carpus 12·25; tail 5·50; exterior rectrices ·75 shorter; tarsus 2·00; middle toe and claw 2·60; inner do. 2·20.

Some differences in the shape of the bill of this species are readily recognizable. It is even stouter than that of *glacialis*, being at the base fully as wide as high; and the lateral laminæ of the upper mandible is bulging and convex rather than straight. The nasal tubes are larger, broader, more depressed, with no traces of median longitudinal carination. Independently of these discrepancies, it is to be distinguished from *glacialis* by the restriction in extent and deep hue of the color of the back; by the white tertials and coverts, dark rectrices, yellow primary shafts, amount of white on inner webs of primaries, etc.

But a single specimen is known to exist in any collection. No. 21304 of the Smithsonian Register. From the North Pacific, the precise locality not known.

THALASSOICA Reich.

Procellaria sp. auctorum.

Thalassoica, Reichenbach, Syst. Av. Type *P. glacialoides*, Smith.

Priocella, Homb. et Jacq. Same type; fide G. R. Gray.

Gen. char. Bill slightly shorter than the head, or tarsus, about three-fifths the middle toe and claw; higher than broad at the base, compressed, not very robust, its sides regularly tapering to the rather thin tip. Unguis attenuated and only moderately hooked; commissure a little curved, outline of inferior mandibular rami, and of gonys, both slightly concave. Nasal

tubes two-fifths as long as the culmen, basally wide and depressed, terminally high and compressed. Feet rather small; tarsus much compressed, as long as the inner toe without the claw; about three-fifths the middle toe. Wings and tail as in *Fulmarus*.

This genus differs from *Fulmarus* in little except the bill; in which, however, the distinction is well marked. The bill has, notwithstanding the presence of the nasal tubes, an aspect which is Laridine to a degree not found in any other genus of the family; and the pattern of coloration in the type of the genus is almost precisely that of a *Larus*.

Two species are known to compose the genus. Intimately allied in form, their colors are more widely diverse than is usually found to be the case in congeners of this family.

THALASSOICA GLACIALOIDES (Smith) Reich.

Procellaria glacialis, Forster, Descr. Anim. ed. Licht. 1844, p. 25, No. 21. Nec Linn., nec auct. al.

Procellaria glacialis, Var. B., Gm. S. N. i. 1788, p. 563. Lath. Ind. Orn. ii. 1760, p. 823.

Procellaria glacialoides, Smith, Illust. S. Afric. Bds. t. 51.

Thalassoica glacialoides, Reich. Syst. Av. Bonaparte Consp. Av. 1856, ii. p. 192.

Thalassoica glacialoides var. *polaris*, Bp. Consp. Av. 1856, ii., p. 192.

Thalassoica glacialoides var. *tenuirostris*. Bonaparte, Consp. Av. 1856, ii. p. 192.

Procellaria tenuirostris, Audubon, Orn. Biog., 1839, v., p. 333. Id. Birds North Amer. vii. 1844, p. 210, (fig. nulla.) Lawrence, in Baird's B. N. A., 1858, p. 826.

Procellaria Smithi, Schlegel, Monog. *Proc.* Mus. Pays Bas, 1863, p. 22.

Priocella Garnoti, Homb. et Jacq. Voy. Pole Sud, pl. 32, fig. 43; fide G. R. Gray.

Habitat.—Southern hemisphere generally, apparently replacing the *F. glacialis*. Columbia River and whole Pacific Coast of North and South America. Cape Horn. Cape of Good Hope. Atlantic and Pacific coasts of Africa. Not in the North Atlantic?

The sulci on the sides of the bill, uniting the lateral laminæ with the unguis, are remarkably narrow, shallow, and indistinct; and the bill in other respects calls forcibly to mind that of a small *Larus argentatus*. The colors of the back, and of the primaries even to the white spaces on their inner webs, and the size and shape of the feet and tail are rather those of a Laridine than a Procellaridine bird.

Nasal tubes a third the length of the culmen, basally broad and depressed: terminally narrower and elevated; their dorsal outline concave, subcarinated, their tip deeply emarginated; nasal septum very thin, and so short as not to reach the end of the nasal tube. Culmen flattened from tube to unguis; latter much elevated and very convex. Shape of lower mandible that of *Larus*. Tarsus much compressed, shorter than middle toe without its claw; hardly exceeding the inner toe alone. Outer toe without its claw longer than the middle. Folded wings reach to end of tail. Primaries broad, tapering rather suddenly to their rounded apices. Tail contained $2\frac{1}{4}$ times in the wing from the carpal joint.

Bill yellow; nasal tube, unguis and sometimes basal portion of superior lateral mandibular laminæ, bluish horn. Feet yellow. Upper parts uniform clear pearl blue; exactly the shade that obtains in some species of *Larus*. This color begins as a faint wash or shading on the nape, deepening as it proceeds backwards until on the interscapular region it has gained its full intensity; which continues undiminished over the whole back, rump, wing coverts, tertials and tail coverts, to the tips of the rectrices themselves. The feathers just along the edge of the wing, however, are grayish slate. Primaries black,

their shafts yellowish white at the base, changing to black towards their apices : their inner webs pearly white near their tips. This white on the first primary extends to within two inches of the tip ; on the rest successively extends nearer the tip of each, till on the innermost it occupies the whole web. Secondaries slaty black on their outer, white on their inner webs. Elsewhere the bird is pure white ; except a small anteocular dusky spot ; and a faint shade of pearl gray on the sides of the breast and body, and on the flanks.

Dimensions. Length 18 to 19 inches, extent of wings about 36. Bill along culmen 2, from feathers on side of lower mandible 1·75 ; its height or width at base ·70 ; nasal tubes ·66. Wing from the carpus 13. Tail 5·25. Tarsus 2 ; middle toe and claw 2·60 ; outer 2·70 ; inner 2·25.

There is no other species towards which the present bears an intimate resemblance. *Th. antarctica* is exceedingly dissimilar in color, though so nearly the same in form. The generic peculiarities—especiallyof the bill—of *Fulmarus glacialis* or *pacificus* at once distinguish the latter.

Synonymy. The *Proc. glacialis* of Forster's Descriptiones Animalium is undoubtedly this species. The expressions regarding the nasal tube—"coerulescens in rostro incarnato,* –apice nigro"; and regarding the primaries—"fusconigræ, margine interiore albido," are quite inconsistent with the true *glacialis*. This is the only instance I have met with of the application of the name "*glacialis*" to this species.

The *Procellaria tenuirostris* Audubon is most certainly this species. I have compared Audubon's type specimen with specimens of undoubted *glacialoides* from various localities. Mr. Cassin has shown (U. S. Expl. Exp. 1858, Birds, p. 409) that possibly Audubon's designation has priority over that of Smith.

I do not suppose that the var. *polaris* of Bonaparte's Conspectus is in any way diverse from the true *glacialoides*.

I hardly know upon what grounds Dr. Schlegel has laid aside the prior names of this species to give it the appellation "*Smithi*."

Thalassoica antarctica Reich.

Procellaria antarctica, Gmelin, S. N. 1788, i. p. 565 ; et auct.
Thalassoica antarctica, Reichenbach, Syst. Av. t. 22, fig. 790. Bonaparte, Consp. Av. 1856, ii. p. 192.

In this species there is the same general character of the nasal tube as in *T. glacialoides ;* though it is comparatively a little broader and shorter, and somewhat less carinated on the median dorsal line. The sulci uniting the different laminæ of the bill are rather deeper and more distinct, taking away something of the Laridine aspect, so marked in the other species. The lateral rostral lamina is wider at its base, and tapers more rapidly to the acute apex by which it is united to the unguis. The tip of the lower mandible is more decurved, and the gonys is a little concave.

The coloration of this species is so peculiar, and so widely dissimilar from any other Procellaridian, that it is needless to give any description here. The species has I believe no important synonyms.

OSSIFRAGA Hombr. et Jacq.

Procellaria sp. Gmelin, et auct.
Ossifraga, Hombron et Jacquinot.

Char. Tail of 16 rectrices, moderately long, rounded. Wings rather short, and not very pointed. Tarsi short, much less than the middle toe without its claw ; compressed, stout, reticulated. Bill as long or rather exceeding the tarsus, very robust ; the nasal case very long, depressed, carinated, the aperture small. Of immense size and powerful organization.

* "Bill black and flesh-colored, the latter hue fading to whitish on drying." I find on the label of a specimen collected by the North Pacific Exploring Expedition. I note this here because the bill is generally described as "yellowish" and to show how pertinent is Forster's expression "incarnato, apice nigro."

But a single species of this genus is known; which in size vastly exceeds all other *Procellarinæ*, and is only itself surpassed by the *Diomedinæ*.

OSSIFRAGA GIGANTEA (Gm.) Reich.

Procellaria gigantea, Gmelin, Syst. Nat. i. 1788, p. 563. Lawrence, Birds N. A. 1858, p. 825, et al. auct.

Ossifraga gigantea, Reichenbach, Syst. Av. t. 20, fig. 332. Bonaparte, Consp. Av. 1855, ii. p. 186.

?*Procellaria brasiliana*, Latham, Ind. Orn. ii. 1790, p. 821, No. 2. Gm. S. N. i. 178, p. 564.

Procellaria ossifraga, Forster, Descr. Anim Ed. Licht., 1844, p. 343.

"*Quebranthuesos*;" "*Bonebreaker*." VULGO.

Habitat. Chiefly the Southern Seas. Has been taken off the Coast of Oregon.

Bill exceedingly robust, compressed, higher than broad at the base; longer than the head, rather longer than the tarsus (chord of the arc of the culmen about equal to the tarsus;) sulci separating the rostral laminæ very distinctly defined. Nasal case very long, more than half the length of the culmen*; basally exceedingly broad, being nearly as wide as the bill; narrowing anteriorly to the small nearly circular apical orifice; on the upper surface so flattened as to be a little concave; the median carination strongly marked, though the ridge is rather broad than sharp, and more elevated anteriorly than at the base; the apex of the case vertically truncated, not emargined. The frontal feathers extend in an obtuse angle a little way upon the root of the case. Unguis large and strong, its dorsal outline very broad and not sharp; regularly decurved, its tip rather obtuse. Commissure much sinuated for its whole length. Gape of mouth moderate, the angle of the commissure falling far short of the eye. Outline of lower mandibular rami about straight: angle of gonys obtuse, its dorsal outline straight, ascending. Feathers of the chin extending quite to the symphysis. Feet very large and stout. Tibiæ bare for a considerable portion of their extent. Tarsus short, stout, much compressed, reticulated: the plates minute posteriorly and superiorly; larger and transversely very broad on the infero-anterior aspect. Toes very long; the outer with its claw as long as the middle; its claw alone shorter than that of the middle toe. Webs full. Hallux a very stout, nearly straight, subconical, obtuse claw. Wings short; not very pointed: when folded falling considerably short of the end of the tail. Tail of moderate length, or rather short for this group; much graduated; of 16 instead of as usual 14 feathers.

Dimensions. Averaging about 3 feet in length by 7 in extent. Bill 3½ to 4 inches. Tarsus 3½. Middle toe and claw 5¾: outer do. about the same; inner do. 4½. Wing from the carpal joint about 20 inches.

The species is found in quite diverse states of plumage. The upper parts are of a varying shade of brown, and more or less mottled with dull white, the edges and tips of many of the feathers being thus colored. Often however there are no traces of this white mottling, and the dorsal plumage is of a uniform sombre fuliginous. The wings and tail seem to be nearly always plain dark brown. In adult birds the under parts, and a portion of the neck in front are white. The amount of this white varies with age; and young or immature birds have the whole under parts similarly colored with the rest of the body; though the hue is usually rather lighter and duller. The gradations in color between old and young are very gradual; scarcely any two specimens, not perfectly mature, being found exactly alike. The feet of some specimens are yellowish, more or less obscured by dusky; of others are uniform fuliginous brownish black. The bill is yellow in all the specimens I have seen. As a remarkable state of plumage which I do not recollect to have seen given, I may instance a specimen in the Philadelphia Academy, which is *pure white* all over,

* But its length seems liable to some considerable variation. I believe it always extends nearly or quite to the root of the unguis.

even to the wings and tail; the continuity of the white only interrupted by a few isolated brown feathers sparsely scattered at irregular intervals over the body. Other specimens in the Academy Museum are in very nearly the plumage described by Gmelin and Latham as *P. Brasiliana;* so that there can be little doubt of the propriety of referring the latter to this species.*

The species and genera treated of in this paper are so few and so well known that an analytical synopsis does not seem to be required.

(*To be continued.*)

Description of twelve new species of UNIONIDÆ from South America.

BY ISAAC LEA.

The species described and figured in this paper were procured in South America by Don Patricio M. Paz, of Madrid, and very obligingly submitted to me. Some of them fortunately were in alcohol, thus preserving the soft parts, which are of great interest. These have been carefully examined and described, and it will be observed that the South American characteristics of the outer hard parts, as well as the included soft parts, which seem to pertain to the *Uniones* of that continent, are here exhibited. I allude more particularly to the *round palpi*, or mouth lips, and the *divergent folds* of the tips of the beaks, neither of which have I observed in our North American species. Very little attention, heretofore, has been given to the soft parts of the *Unionidæ* of South America, and none to the *embryonic shell*, except by myself. M. d'Orbigny, in his *Voyage dans l'Amerique Meridional*, has imperfectly described and figured the soft parts of some of the genera. Spix, in his *Testacea Fluviatilia Braziliensia*, takes no notice of the soft parts of the species, which he describes and figures with much accuracy.

Unio peculiaris.—Testa lævi, quadrata, compressiuscula, inæquilaterali, postice obtuse angulata, antice rotunda: valvulis crassiusculis, antice aliquanto crassioribus; natibus subprominentibus, ad apices divaricati undulatis; epidermide virido-fusca, eradiata; dentibus cardinalibus parviusculis, compressis, obliquis, in utroque valvulo duplicibus; lateralibus longis, lamellatis curvisque; margarita cæruleo-alba et iridescente.

Embryonic Shell subtriangular, light brown; dorsal line rather long and straight; side margins irregular and unequal—one being a segment of a circle, the other an irregular curve line—forming an obtuse angle at the base; basal margin obtusely angular and furnished with hooks; granulate over the whole surface.

Hab.—South America, Don Patricio M. Paz.

This very peculiar and unique form is now for the first time observed. Its unequal lateral margins give it an abnormal and lapsided appearance, totally differing in this from any other species known to me.

Unio firmus.—Testa lævi, elliptica, subinflata, valde inæquilaterali, postice et antice rotundata; valvulis crassiusculis, antice aliquanto crassioribus; natibus prominulis; epidermide viridi-fusca, eradiata; dentibus cardinalibus subcrassis, compressis; in utroque valvulo duplicibus; lateralibus longis, lamellatis subcurvisque; margarita argentea et valde iridescente.

Hab.—South America, Don Patricio M. Paz.

Unio rugososulcatus.—Testa sulcata, triangulari, subinflata, subequila-

Description of five New Species of the Genus UNIO.

BY ISAAC LEA.

Unio Siamensis.—Testa lævi, transversa, subcylindracea, ad basim emarginata, valde inæquilaterali, subcompressa, ad latere planulata, postice truncata, antice rotundata; valvulis tenuissimis, diaphinis; natibus prominulis; epidermide luteo-oliva; dentibus cardinalibus acicularis, sublongis, obliquis; lateralibus longis, lamellatis subrectisque; margarita alba et iridescente.
Hab.—Siam; C. M. Wheatley.

Unio asperulus.—Testa plicata, elliptica, inæquilaterali, postice subbiangulata, antice rotundata; valvulis subtenuibus; natibus subprominentibus, ad apices undulatis; epidermide viridi-oliva, obsolete radiata; dentibus cardinalibus lamellatis, parum obliquis, in dextro duplicibus; lateralibus sublongis, lamellatis subcurvisque; margarita cærulea et valde iridescente.
Hab.—Siam; Thomas R. Ingalls, M. D.

Unio pilatus.—Testa lævi, elliptica, valde inæquilaterali, postice obtuse angulata, antice rotundata; valvulis crassiusculis, antice crassioribus; natibus subprominentibus, ad apices minute undulatis; epidermide luteo viridi, micanti, obsolete radiata; dentibus cardinalibus duplicibus; lateralibus sublongis, subrectis lamellatisque; margarita alba et valde iridescente.
Hab.—Siam; Thomas R. Ingalls, M. D.

Unio evitatus.—Testa lævi, elliptica, valde inæquilaterali, postice subbiangulata, antice rotundata; valvulis subtenuibus, antice parum crassioribus; natibus prominulis, ad apices divaricate undulatis; epidermide olivacea, obsolete radiata; dentibus cardinalibus parviusculis, compressis, in utroque valvulo duplicibus; lateralibus sublongis, subrectis lamellatisque; margarita alba et iridescente.
Hab.—Bengal; W. A. Haines.

Unio Strebelii.—Testa lævi, oblonga, ad latere compressa, inæquilaterali, postice obtuse angulata; antice rotundata; valvulis subcrassis, antice aliquanto crassioribus; natibus prominulis; epidermide luteo-fusca, radiata; dentibus cardinalibus subcrassis, elevatis, crenulatis, in utroque valvulo duplicibus; lateralibus sublongis, subcrassis, subcurvatus corrugatisque; margarita vel purpurea vel salmonea et valde iridescente.
Hab.—Vera Cruz, Mexico; G. Strebel.

Description of two New Species of the Genus LITHASIA.

BY ISAAC LEA.

Lithasia cylindrica.—Testa striata, cylindracea, flavescente, vittata vel evitata; spira subelevata; suturis irregulariter impressis; anfractibus constrictis, ultimo grandi; apertura subconstricta, rhomboidea; labro acuto, sinuoso; columella alba et valde sinuosa.
Hab.—Coosa river; E. R. Showalter, M. D.

Lithasia Wheatleyi.*—Testa lævi, subcylindracea, luteo-virente, vittata; spira elevata; suturis irregulariter impressis; anfractibus planulatis, ultimo subgrandi; apertura subconstricta, rhomboidea, intus vittata; labro acuto, sinuoso; columella alba et valde iridescente.
Hab.—Cahaba river, Alabama, E. R Showalter, M. D.

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* Named after Mr. C. M. Wheatley, to whom I am indebted for the possession of a specimen

Critical Review of the Family PROCELLARIIDÆ:—Part IV; Embracing the ÆSTRELATEÆ and the PRIONEÆ.

BY DR. ELLIOTT COUES, U. S. A.

In the present paper, the fourth of the series, are together considered the *Æstrelateæ* and the *Prioneæ*, mainly for the purpose of showing how closely related these sections are through certain of their genera.

For the first of these sections three names are at our disposal; sc. *Æstrelateæ*. *Daptioneæ* and *Rhantisteæ*. Of these I prefer to accept the first, both as having priority, and being taken from the name of the typical and largest genus of the group; the second being based upon a subtypical genus with but a single species, and the third being derived from Bonaparte's erroneous identification of Kaup's Fulmarine genus *Rhantistes*.

The section *Æstrelateæ*, as here restricted, corresponds very nearly with the group defined under this name in Bonaparte's Conspectus. There is here, however, included in it the genus *Daption**, by Bonaparte placed among the *Fulmareæ;* and it is considered as probably connecting the *Æstrelateæ* with the Prions. The genus *Thalassoica* is excluded as being essentially Fulmarine. In generic arrangement I am compelled to differ widely from the distinguished author just named. After attentive and critical examination of his genera *Cookilaria*, *Pterodroma* and *Bulweria*, I must confess my inability to distinguish either of them from *Æstrelata* by a degree of morphological difference which, by any sublimation of characterization, can be considered of generic import. "Bulweria" has a rather more elongated and decidedly cuneiform tail than have the majority of the Æstrelatas; but differs from some of them in this respect, no more than they do among themselves. "Pterodroma" comprises some fuliginous species morphologically identical with *Æstrelata*. "Cookilaria" has no characters whatever assigned to it by its author; possibly because none are to be found in the species included under it.

I do not hesitate to follow natural data afforded by specimens, even should they conflict with the opinions of so justly distinguished an author as that of the "Conspectus;" especially since the more closely I scrutinize his work upon the Petrels, the more irresistibly the conviction is forced upon me, that it is, to speak in the mildest terms, unreliable. It cannot be denied by the most strenuous of his advocates, that there are to be found in this work instances of unnecesssary if not unwarrantable pseudo-generic subdivisions; of some pure figments in the way of species; of rash collocation of synonymy; and of weak and intangible diagnoses. These are to the last degree discouraging, because perplexing, to the student,—*credc mihi experto*. They would, however, be less repellant, and bear much more weight, could we feel satisfied that they represented the matured opinions of the author, based upon well-digested facts. Such unhappily is not the case; for the views expressed on different occasions are found to fluctuate according to the particular theory which may have been in posse sion of his mind at the time of writing; and are often diametrically opposed to each other. That I may not seem to wantonly criticise one of the most brilliant lights that has ever shed its radiance upon Ornithology, to whom alas! it was not permitted to finish his last great work, I may be allowed to sustain myself by a simple comparison of the "Conspectus" with the Table of the Longipennines published in the Comptes Rendus. The fasciculi of the former which treat of the Petrels bear date of Dec., 1855, and Jan., 1856; the latter is of the séance of April 28, 1856. I only cite some of the more glaring discrepancies of generic arrangement and distribution of species; for concerning synonyma it may be stated that as a general rule conflicting views are entertained on all debatable points.

* The true relationship of this genus is still with me a matter of some uncertainty.

C. A. Genus *Majaqueus* placed among the *Puffineæ*; *Pterodroma* and *Pagodroma* among the *Æstrelateæ*.—C. R. These three genera placed among the *Fulmareæ*.

C. A. *Priocella Garnotii*, H. and J. (= *Thalassoica glacialoides* according to Gray) not recognized.—C. R. Given as a valid genus and species of *Fulmareæ*.

C. A. *Proc. meridionalis* Lawr. considered as a synonym of *Æstrelata diabolica*.—C. R. Given as a valid species of genus *Fulmarus*.

C. A. Genus *Adamastor* founded and considered as a component of the *Fulmareæ*, with *typus* Bp. (=*cinerea* Gm.) *sericeus* Less. and *flavirostris* Gould, as its species.—C. R. Genus *Adamastor* abandoned, and its three species *distributed* thus:—*typus* (here called *cinerea* Gm.) is put under *Priofinus*,* among the Puffins; *flavirostris* and *sericeus* (the latter queried as to validity) are put under *Æstrelata* of the "*Rhantisteæ*."

C. A. Genus *Cookilaria* established with *leucoptera* Gould, *velox* Soland., *solandri* Gould, and *mollis* Gould, as its species.—C. R. *Cookilaria* abandoned, *Rhantistes* ex Kaup† taken, with *Cookii* Gray, *velox* Sol. *mollis*, "unicolor," "raolensis" Gould, and *Lessoni* Garnot as determined species; *rostrata*, *parvirostris* Peale, *gelida* Gm. and *sandaliata* Sol. as doubtful species.

C. A. Genus *Æstrelata* contains *diabolica* L'Herm. (syn. *hæsitata* Temm. Kuhl,) *desolata* Gm. *inexpectata* Forst. (=*mollis* Gould) and *leucocephala* Forst. (=*Lessoni* Garnot.)—C. R. The same genus is made to contain *diabolica* L'Herm. *hæsitata* Temm. (here considered distinct from *diabolica*,) *sericea* Less. *flavirostris* Gould, *desolata* Lath.; with *gularis* and *brevipes* Peale, and *inexpectata* Forst. as doubtful species.

C. A. Genus *Nectris* Bp. emend. ex Forst. contains *brevicauda* Brandt, *carneipes* Gould, *fuliginosus* Strickl. *gama* Bp. and *tenuirostris* Temm.—C. R. *Nectris* abandoned, and its species thus distributed: *brevicaudus* and *carneipes* are put with *cinereus* Gm. under *Priofinus* H. & J.; *fuliginosa* Strickl. is made a queried synonym of *Puffinus major* Faber; *gama* Bp. does not appear; while *tenuirostris* is united with *sphenurus*, etc., under the genus *Thiellus*.

However great the changes and innovations thus introduced,—which are indeed "une foule des faits nouveaux relatifs á la classification, á la nomenclature, á la synonymie, et aux divers rapports des espèces," resulting "de leur étude approfondie"‡ between Dec. 1855 and April 1856, I am unwilling to believe that the "Table" is drawn up with reference to the size and shape of the Comptes Rendus page, rather than in accordance with truth.

The numerous difficulties which beset us in the critical investigation of any group of the Petrels, reach their maximum in the section now under consideration. This is in a measure due to the habitat of most of the species—the genera being essentially South Pacific and Antarctic in their distribution—which renders the acquisition of specimens difficult, at least in such numbers as to enable extended comparisons to be instituted, and the great changes of plumage which a majority of the species undergo with increasing age, to be fully and accurately elucidated. Some are to this day known only by type specimens; while of many others we are no more familiar regarding variable features of coloration, than to enable us to speak in the most general terms of the changes undergone during progress towards maturity. But these are among the minor evils to be contended with; for Nature herself is perhaps never so difficult of comprehension, as we often find our attempts to understand her to be. And so the confounding of distinct species under one name and description; the making of nominal ones out of changes of plumage and variations in size; together with the misinterpretation by writers of the labors

* This is an important correction. "*Priofinus cinereus*" is the proper name of the species called in the C. A. "*Adamastor typus*."

† This name of Kaup's is a synonym of *Fulmarus* Leach.

‡ Bp. C. R. April 28, 1856, p. 767.

of their predecessors, have produced a bibliography so *embrouillée* as to defy our most patient efforts to completely unravel the entangled skein, and to cause us to turn with weariness if not disgust from the hopeless task. The necessity which exists for the *study*—I use the word advisedly—of synonyma, is the opprobrium of ornithology; and the kind of labor demanded for their elucidation is far removed from the real pursuit of science itself. At the same time, while an inevitable, it is too often a thankless labor, and one hardly appreciated; the results of which are usually incommensurate with the time and trouble expended. Collocation of synonyma is by no means mere clerical compilation. It is a species of investigation which, to be productive of any value, demands a sound judgment and powers of discrimination perhaps of as high a grade as those required for the successful study of genera and species. But it does not often bring to its author such rewards as are willingly granted him who elucidates other classes of facts in Natural History. For as its chief duty is to deal with disputed points, it enters an arena where more conspicuously figure not facts but rather opinions; concerning which the right of arbitration is yielded by no man to another, The synonymist must ordinarily expect acquiescence with his views from those only whose ideas are not jostled by the opinions he advances.

It is impossible to pursue a critical investigation of the *Procellariidæ* without being impressed by these facts; which must be my only weapon wherewith to turn the edge of criticism from my efforts towards the elucidation of the family. No one can be more painfully aware of the errors of omission and doubtless also of commission, which must be met with in these papers; and none can be less tenacious of debatable views, or more ready to relinquish opinions when proof of their fallacy is made apparent. I only ask a thorough examination before a condemnatory fiat is passed upon any of the views entertained which may be at variance with current opinions.

As a rule I have adopted for species no name to which any doubt as to identity attaches; while those still open to discussion I have endeavored to treat of solely with reference to their intrinsic merits, no extraneous claims to our consideration being acknowledged. I regret the necessity of frequent citations of manuscript names and unpublished drawings, which we are by no means bound to recognize; but which have become so interwoven with the bibliography of the family, that it is impossible to avoid so doing.

The present paper, like others of mine, is doubtless amenable to the charge of "discursivene s." This fault, if it be one, is certainly of that class which "lean to virtue's side;" and one which at present I feel indisposed to correct. Words are cheap enough; and had they not been so parsimoniously doled out in the earlier days of ornithology, there would now be less need of a profuse expenditure of them.

The *Æstrelatæ*, as I regard them, are composed of three genera, which may be briefly diagnosticated as follows:—

A. Tail much graduated, or cunëiform.
   I. Bill robust, compressed, the unguis large, and curved from the nostrils. Extension of feathers on forehead normal. Hallux small. Nostrils short..... *Æstrelata.*
B. Tail slightly rounded.
   II. Bill stout, compressed, unguis large, nostrils short. Forehead low, flat, the feathers encroaching far on the bill. Interramal space feathered. Hallux large and stout..... *Pagodroma.*
   III. Bill greatly dilated. Nostrils long. Feathers on forehead normal in extension. Unguis small and weak. Interramal space partially naked. Hallux ordinary... *Daption.*

Color also affords us an excellent artificial index to these genera. Thus *Æstrelata* is bicolor or fuliginous; *Pagodroma* is unicolor, white; and *Daption* is spotted with light and dark colors.

[May,

The first of these genera, after the fusion with it of those of Bonaparte already adverted to, is quite an extensive one, comprising more species than any other of the family. In this paper I enumerate eighteen, which appear to have just claim to recognition. At the same time some of them, as I intimate, may not be valid, while I am quite willing to believe that there may exist good species of which no cognizance is here taken.

ÆSTRELATA Coues, [emend. ex Bp.]

Procellaria sp. Auctorum.
Daption sp. Stephens, Shaw's Gen. Zool. xiii. 1825.
Puffinus sp. Webb and Berthelot, Av. Canar. 1836—44.
Ossifraga sp. et *Thalassoica* sp. Reichenbach, Syst. Av.
Æstrelata, Bonap. C. A. 1855, ii. p. 188. Type *Proc. hæsitata*, Temm.
Cookilaria, Bonap. C. A. 1855, ii. p. 190. Type *Proc. Cookii*, Gray.
Pterodroma, Bonap. C. A. 1855, ii. p. 191. Type *Proc. macroptera*, Smith.
Bulweria, "Bp. 1836." (Gray.) Bp. C. A. 1856, ii. p. 194. Type *Puff. columbinus*, Webb and Berthelot.
Rhantistes, Bonap. Compt. Rend., April, 1856, xiii. p. 768. Type *Proc. Cookii* Gray. (Not of Kaup, 1829, the type of which latter is *Proc. glacialis*, Linn.)

Chs.—Bill about as long as the tarsus; very stout; compressed; higher than broad throughout; lateral outlines nearly straight, converging to the much compressed unguis. Unguis particularly large, strong, its upper outline very convex, its tip greatly decurved; arising almost immediately from the end of the nasal tubes, leaving but a very brief and quite concave culmen proper. Lateral element of the bill very strong; rising high up at the root of the nasal case; somewhat inflated throughout; and with a strongly convex inferior border; which with the great decurvature of the unguis produces an extremely sinuate commissure; outline of lower mandible nearly straight; of gonys a little concave; eminentia symphysis well marked. Sulci on both upper and under mandibles distinct. Nasal tubes of moderate length, elevated, conspicuous, not carinated, dorsal outline about straight, apex more or less vertically truncated, orifice subcircular, each naris oval, separated from its fellow by a thin vertical portion which comes well forward. Interramal space narrow, fully feathered. Wings comparatively longer than in most sections, surpassing the tail when folded; pointed; but the second primary nearly as long as the first. Tail long, and much graduated; sometimes almost cuneate, usually much rounded; the rectrices quite broad to their tips. Feet of moderate size; tarsus moderately compressed, with the ordinary small subhexagonal reticulations; about as long as or a little less than the middle toe without its claw. Outer toe rather surpassing the middle; with its claw about equalling the middle and claw. Tip of inner claw reaching base of middle one. Hallux short, sessile, conical, acute, elevated. Of moderate and rather small size; bicolor, or nearly so; in youth nearly unicolor.

The genus *Æstrelata* as thus defined is quite an extensive one, comprising a larger number of species than any other of the family. In its geographical distribution, it is essentially southern and antarctic; only a very few of the eighteen or more known to compose it being found in north temperate latitudes. The numerous species all agree in certain points which separate them from others; the principal of which is the large size and great convexity of the unguis of the bill: which begins to rise almost immediately from the nasal case. Other peculiarities will be noted in the above diagnosis; which have caused the species to be put in intimate relation to each other when collocated even by those writers who recognize but one, or at most three or four genera of *Procellariinæ*.

Taking the *hæsitata* as the type of the genus, we find that most of the species,—*Lessoni*, *rostrata*, etc. agree entirely with it: while some others, e. g. *Cookii*, differ in being smaller and more slenderly built, with rather less

robust bills, somewhat longer and more pointed wings, etc. These latter characters have been made typical of a distinct genus by Bonaparte. The gradation, however, in these and all other features is so gradual, through several intermediate forms, that I do not see how we are to draw the dividing line. Bonaparte moreover includes in *Cookilaria* such a species as *Solandri*, which is particularly a robust bird.

Throwing out of consideration the fuliginous "Pterodromine" group, we find that the other species of *Æstrelata* adhere quite closely to a particular pattern of coloration. When adult they are dark colored above, being of some shade of brown or black, with more or less of an admixture of cinereous, and generally have a white forehead. The color of the upper parts extends on the sides of the breast; otherwise the under parts are wholly white. When young, the color of the under parts does not differ very notably as a general rule from that of the upper: the white being obscured by a dusky, fuliginous or cinereous clouding of the tips of all the feathers, the basal portions of which remain white. In general the younger the bird the more uniform, or more tending towards fuliginous are its colors: while in adult life light and dark colors occupy distinct areas, and are quite trenchantly defined.

When we consider, therefore, the great change which the plumage undergoes in the bird's progress towards maturity, together with the similarity that exists between corresponding ages, it will not appear surprising that not only very numerous nominal species should have arisen, but that names of species should have been frequently misapplied to others than those to which they rightly belong; producing a confusion in the synonymy certainly not surpassed, if indeed equalled, in any other genus in ornithology. A number of the species were first brought into notice by voyagers; and when named by professed naturalists it was at a time when the neces-ity of detailed descriptions was not appreciated, so that the nice points of size and proportion which really distinguish the species more than color, were rarely presented. The consequence is that it is now impossible to identify many of the older names with any degree of certainty, except perhaps by incidental or collateral testimony; and to this day a great many identifications remain matters of opinion rather than of fact.

Nor is the confusion and uncertainty by any means less in the fuliginous group which goes to compose this genus. Its components, so far as we know, are in every age unicolor; and are absolutely indistinguishable except by form and dimensions. This alone would have been amply sufficient for the production of synomyms and malidentifications innumerable; but this inevitable result is furthered by another fact. The "genus" *Pterodroma* is among the *Æstrelatæ* exactly what *Nectris* is among the *Puffineæ;* i. e. composed of species differing in no wise in form from *Æstrelata* or *Puffinus*, and which are entirely fuliginous in color. Now the points of form separating the species of "*Pterodroma*" from "*Nectris*" are by no means patent on a casual examination; and hence, among the older writers we find many descriptions which it is impossible to refer with any degree of certainty to one or the other genus, of which, in short, we can say no more than that a fuliginous petrel formed the subject of the article. Consequently, some synonyms have ever been oscillating as to weight of authority between these two groups.

I confess to a feeling of surprise, when, on examining critically species typical of Bonaparte's genus *Pterodroma*, I could find absolutely no points of form whereby it might be held separable from *Æstrelata*. I do not think that the skeleton will be found to present any tangible morphological characters, critically examined in its minutest details of intermaxillary bone or phalanges; nor do the remiges or rectrices in their relative developments offer the slightest discrepancies. We must have recourse therefore to color alone if we would separate them; and Bonaparte himself gives us no other character

[May,

whereby we may recognize his genus. I am therefore constrained to unite the so-called genus with *Æstrelata*.*

This fuliginous section, then, of *Æstrelata*, comprehends some four or five species, very widely distributed, as regards latitude; though, so far as we now know, chiefly occurring in the tropical and temperate portions of the Atlantic. A new species from Jamaica is being published as I write.†

With the exception perhaps of *A. Bulweri*, these are only distinguishable by size and some points of coloration of the feet.

This latter species differs from the type of "Pterodroma" in the somewhat more elongated and decidedly cunëiform tail, which is hardly contained twice in the wing from the carpal joint; and perhaps in having comparatively slightly smaller feet. The difference in the tail is no greater than that existing among unquestioned species of *Æstrelata*; and in all other points there is an absolute identity of form. This species is the type of Bonaparte's genus *Bulweria*, and by him it is placed among the Thalassidromines; upon what grounds I am at a loss to conjecture.‡ The "genus" seems to me to bear exactly the same relation to *Pterodroma* that *Thiellus*, Gloger, (as defined by Bonaparte to include *sphenurus* Gould, and *chlororhynchus* Lesson), does to *Nectris*.

The genus *Cookilaria*, founded by Bonaparte upon the *Pr. Cookii*, Gray, has not even an apology for characters whereon to base claims to recognition. A diagnosis is not attempted by its author; and a few weeks subsequently the name is dropped; § and *Rhantistes*‖ substituted, although the species collocated under the latter designation are by no means the same as those previously included in *Cookilaria*.

The other partial synonyms quoted at the head of this article are merely instances of the reference to them of some of the species included in the genus as it is here defined and limited. Of the several names at our disposal, *Æstrelata* has, so far as I can ascertain, the priority. The species given in the following pages include all I have been able to learn of, through specimens or books, as having just claims to recognition. Very possibly some valid ones are omitted; and perhaps some now retained may hereafter help to swell the list of synonyms; that wearisome and vexatious, but inevitable, mass of rubbish, repelling inquiry, and retarding progress, under the burden of which ornithology now labors.

ÆSTRELATA HÆSITATA (Kuhl) Coues.

Procellaria hæsitata, Kuhl. Mon. Proc. Beit. Zool., 1820, p. 142, No. 11. [Excl. synon.]—Temminck, Planches Colorées, No. 416.—Lesson, Traité Ornith. 1831, p. 611, [Excl. synon.]—Newton, Zoologist, x. 1852, p. 3691.—Schlegel. Mon. *Proc.* Mus. Pays-Bas, 1863, p. 13.

Æstrelata diabolica, Bonaparte, Consp. av. ii. 1835, p. 189. ex "*Procellaria diabolica*, L'Herminier."

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* This procedure may seem inconsistent with the course followed in a previous paper of mine upon the *Puffins*. It is there, however, explicitly stated that the difference between *Nectris* or *Thiellus*, and *Puffinus*, is scarcely aught than that of color, and that these genera "are hardly worth retaining, except it be for convenience's sake." (Page 117; and see also pp. 122, 128, 142, 143.) The recognition of genera founded upon fuliginous color in this family is perhaps peculiarly to be deprecated; since some species are known to pass from a fuliginous unicolor to a bicolor state of plumage with increasing age; and moreover, it is by no means incontrovertibly proven that some supposed fuliginous species are not merely immature plumages of others. I most willingly relinquish the position above referred to; and am now indisposed to degrade, even upon a plea of utility, so harmonious a group as every natural genus forms.

† *Pterodroma carribæi* Carte, P. Z. S. of which I learn through the kindness of Dr. Sclater, but of whose characters I have no means of judging.

‡ The species is also included in the genus *Thalassidroma* by G. R. Gray. Examine in this connection my remarks p. 89, of the Proc. Phila. Acad. for 1864, where its affinities are shown to be with the Æstrelatean genus *Pterodroma*. By a lapsus calami the word "Fulmareæ" there appears instead of "*Æstrelateæ*."

§ Comptes Rendus, Apr., 1856., xlii. p 768.

‖ This is merely a misuse of a name of Kaup's founded in 1829 upon the *Pr. glacialis*, Linn., and therefore a synonym of *Fulmarus*, Leach, of 1825. (Steph., Shaw's Gen. Zool. 1825, xiii. p. 233.)

Procellaria meridionalis, Lawrence, Ann. Lyc. Nat. Hist., New York, iv. 1848, p. 475.—Id. Ibid. v. 1852, p. 220, pl. xv. Id. B. Amer., 1858, p. 827. [Ex *Proc. brevirostris* Lawr. olim.]

Fulmarus meridionalis, Bonaparte, Tabl. *Gav.* Compt. Rend., 1855. *Puffinus L'Herminieri*, Lesson, fide Bp. "Cat. Mus. Av. Rocheforte, 1843, p. 976, sp. 5958."

Procellaria rubritarsi, Gould, (nomen ined. supprimend.)

Habitat.—Atlantic ocean, coasts of America and Europe. The most boreal of the bicolor species of the genus, and the only one hitherto detected on our shores.

*Form.**—The bill is about as long as the tarsus; much shorter than the skull; longer than the middle toe; very stout; but slightly higher than broad at the base; moderately compressed in the rest of its extent. The lateral lamina is very strong and large, a little inflated, short, very deep at the base. The unguis is large and strong, and its convexity begins almost from the end of the nasal case, leaving but a very brief and very concave culmen proper. The commissure is extremely sinuate, having several different curves. The unguis of the lower mandible is also strong, its point a little decurved, the gonys convex, the angle at the symphysis acute but not very prominent. The sulcus on the side of the inferior mandibular ramus is distinctly marked. The nasal case is in length about a fourth of the culmen; broad, depressed, scarcely carinate; the orifice large, subcircular; apex a little obliquely truncated; each naris oval, with a distinct septum which reaches to the end of the case. The frontal feathers overlap the base of the bill, and descend in a nearly straight line on the sides; thence rapidly retreating backwards. The feathers on the side of the lower mandible extend much further than to a point perpendicularly beneath the furthest extension of those on the upper. The interramal space is fully feathered.

The folded wings reach a little beyond the end of the tail; the first primary is longest; the second nearly equal; the rest rapidly graduated.

The tail is very long, being contained scarcely more than twice in the length of the wing from the carpal joint. It is very cuneate in shape; the central feathers sometimes even projecting slightly beyond the rest. The difference between the median and outer pair of rectrices is fully one and a half inches.

The tarsi are moderately stout, and very regularly reticulated with small sub-hexagonal plates; largest on its interior aspect. In length it about equals the middle toe without the claw. The outer toe is a little longer than the middle; but the claw of the latter is so much longer than that of the former, as to make the tips of the two about equal to each other. The tip of the inner claw just reaches the base of the middle one. The latter is a little dilated on its inner aspect. Hallux of the usual shape.

Color.—On the crown of fully adult birds there is a vertical central area or "calotte" of blackish brown. The more mature the bird, the smaller is this spot, and the more trenchantly are its edges defined against the white which surrounds it on all sides. But in young or immature birds,—in fact, in the majority of all the specimens we examine,—this perspicuous definition of the dark area is interfered with in this wise: on the front many of the feathers are brownish black, producing a spotted or variegated appearance; and the same dark color, usually somewhat diluted in tint, extends from the crown on to the occiput, nape, and even adown the back of the neck, until it may coalesce with the color of the back. On the sides of the crown the dark color may be generally distributed, merging into the transocular fascia of dark color which always exists. This latter band of color which passes through the eye is in adult birds well defined, and quite distinct from the calotte. In all ages and plumages it is somewhat darker in tint than the crown itself.

* The description is taken from a specimen in the Philadelphia Academy; with which is also compared Mr. Lawrence's type of *Procellaria meridionalis*.

These simple facts regarding the varying extension of the dark colors of the head and neck, in a species which otherwise is not known to differ materially in plumage, have given rise to descriptions so worded as to be apparently quite in conflict with each other.

Back a nearly uniform clear bistre brown: but most of the feathers often have slightly lighter margins of an ashen hue. The shade of brown of the back deepens on the wings and wing coverts into blackish brown; which is especially intense in color on the outer webs of the primaries; their inner vanes being fuliginous brown.

The distal half of the tail is like the wings in color: the basal half is white, except the outer web of the exterior feather, and to a less extent some portions of the outer webs of the two next ones. A few of the shortest, most anterior upper tail coverts are colored like the back; the rest are white. On the sides of the flanks a few feathers are touched with brown.

The upper tail coverts; the forehead, lores, sides of head, neck,* under wing coverts, (except the row just along the edge of the wing), axillars and whole under parts are white.

Bill black; iris brown; tarsus, first joint of toes, and contained portion of webs flesh-colored;† rest of webs and toes, with claws and hallux, black.

In the young bird, the colors generally are rather darker, and tending more strongly towards smoky brown; but I have never seen a specimen entirely dark-colored below, though such a state of plumage may be found. The head and neck all around, and upper part of the breast, may be concolor with the back, as described under the young *Lessoni*.

Dimensions. Bill (chord of culmen) 1·45. Nasal tubes ·33, (a little more or less). Height of bill at base ·68; width ·60; depth at greatest convexity of unguis ·60. Wing (average) 12·00; tail 5·50 to 5·75. Tarsus 1·45: outer toe and claw 2·12; middle do., the same; inner 1·75. Gradation of tail about 1·50.

The subject of the present article bears an intimate resemblance to no other species of Petrel; and, on this account, it is the more surprising that its synonymy should have become so involved as it will be evident is the case from the succeeding remarks on its bibliography; and, particularly, it has no sort of resemblance to the *Adamastor cinereus*, to which its name of *hæsitata* has been so often misapplied. Moreover, the species, so far as we know, is not subject to as great changes of plumage as many others of the genus; its general aspect, as regards color, is not that of the other congeneric species, but rather of *Puffinus major;* and why, therefore, its synonymy is so involved is a difficult matter to conjecture.

Bibliography. The first definite reference to this species which I have found is the *Proc. hæsitata* of Kuhl, as above cited. The description given by this author is entirely pertinent, both as to colors and dimensions; in fact, some expressions quite exclude any other species. Dr. Kuhl also speaks of his specimen as being "in musæo Bullockiano, nunc in Temminckiano," so that, very probably—though I can by no means speak with certainty—his bird was the very individual which furnished the subject for Pl. Col. 416 of Temminck; an accurate figure now universally referred to as representing this species.

At the outset we thus have a very definite starting-point in discussing the synonyms of this species; but, most unfortunately, Dr. Kuhl adduces as synonyms of his *hæsitata* two references‡ to Forster's unpublished drawings, and cites Forster as authority for the species. Whereas, neither of these drawings refer to the bird now under discussion; and the first *published* use of the

* Neck all around (adults): on sides only (young;) white.

† Dull yellowish in the dried state.

‡ "Forster, tab. 97;" and "tab. 98, sub nomine Procellariæ leucocephalæ." Mr. A. Newton, (Zoologist, x. p. 3696,) tells us that No. 97 is the *mollis* of Gould, called *hæsitata*: No. 98, the *Lessoni* of Garnot, called *leucocephala;* and without opportunity of examining these drawings, I rely upon Mr. Newton's authority.

name *hæsita'a* by Forster was to indicate a very different bird;* not an *Æstrelata* at all, but one of the *Puffinece*. These unfortunate citations have ever since been the cause of a sort of double employ of the name by ornithologists. The synonyms at the head of this article, taken in connection with those given under *Adamastor cinereus*, (Pr. A. N. S., 1864, p. 119,) contain most of the references of consequence which bear on the question.

One must not fail to consult in this connection Mr. A. Newton's very thorough and lucid exposition of the bibliography, as well as an accurate description, of this species, given in the "Zoologist," as above cited, on the occasion of the first introduction of the bird into the British Avifauna. Some very important corrections and verifications are there presented.

The name *hæsitata* Forst. had been long in existence, in manuscript, for a species very different from the present; but being first published, (in 1820, when we first gained the right of recognizing it,) by Dr. Kuhl, for the species now under consideration, it must necessarily stand in this connection. I do not see, therefore, why Bonaparte supersedes it by *diabolica* of L'Herminier. This latter quotation, as well as the reference to a *Puffinus L'Herminieri* of Lesson, I present on the authority of Bonaparte, not having the opportunity of verifying them personally. The name "rubritarsi" of Mr. Gould is to be suppressed as unpublished by him, and, moreover, as conveying an erroneous impression regarding the color of the feet.

The *hæsitata* of Lesson's Traité, p. 611, is this species; but the author erroneously cites *hæsitata* Forst. and *leucocephala* Forst. as synonyms.

I have before me the type specimen of *Procellaria meridionalis*, kindly transmitted to me for examination by Mr. Lawrence. It is an example of *Æstrelata hæsitata*; as, indeed, Mr. Lawrence himself suspects may be the case. (B. N. Amer., text of p. 827.) Any differences which may exist in the specimen in question, from the figure given by Mr. Newton in the Zoologist, seem rather accidental than real. This same individual had been formerly called "brevirostris" by Mr. Lawrence—a name preoccupied by M. Lesson for a fuliginous species of "*Pterodroma*." Mr. Lawrence enumerates with entire accuracy the synonyms of this species under head of *Proc. meridionalis*, in the Birds of North America, p. 827. The name *hæsitata*, as employed by Mr. Lawrence, and also by Mr. Gould, refers to the *Adamastor cinereus*, and not to the present species.

I have not met with any names or descriptions published during the eighteenth century which are definitely referrible to this species; and, if there be any other synonyms than those above commented upon, they have not been brought sufficiently into notice to require recognition in this connection. The chief point is to be able to decide, without hesitation, to what *hæsitata*, as used by different authors, really refers.†

ÆSTRELATA LESSONI (Garnot) Cassin.

Procellaria Lessoni, Garnot, Ann. Sc. Nat., 1826, vii. p. 54, fig. 4, (mala.) South Pacific, Cape Horn, lat. 52°, long. 85w. Lesson, Traité Orn., 1831, p. 611. Gould, B. Aust., pl. 49, (accuratissima et pulcherrima.) Reichenbach, Syst. av. tab. 24, fig. 2605; et tab. 20, fig. 339, and of authors generally.

Æstrelata Lessoni, Cassin, Cat. Bds. North Pac. U. S. Expl. Exped. in Pr. A. N. S. Ph., 1862, p. 327. South Indian Ocean.

Rhantistes Lessoni, Bonaparte, Comptes Rend. xlii. 1856, p. 768.

Procellaria leucocephala, Forster, Ed. Licht. Descr. Anim., 1844, p. 206, sp.

* To wit, the *Adamastor cinereus*, ex *Proc. cinerea* Gm. Lath. Compare carefully, in this connection, my remarks, pp. 119, and 128, of the Philadelphia Academy Proceedings for 1864.

† For convenience of reference: *P. hæsitata* of Kuhl, Temminck, Lesson, Newton, Schlegel, Bonaparte, and of some other authors, is the *Æstrelata hæsitata* of this paper. *P. hæsitata* of Forster, Gould, Reichenbach, Lawrence, is the *Adamastor cinereus* of Pr. A. N. S. Ph., 1862, p. 119.

177. New Holland to Cape Horn. Gould, Am. et Mag. Nat. Hist. xiii. 1844, p. 363. From Cape of Good Hope to Van Diemen's Land.

Æstrelata leucocephala, Bonap. C. A., 1856, ii. p. 189.

? Procellaria alba, Gmelin, S. N. i. pars ii. 1788, p. 565. Vieill. Nouv. Dict. 1817, xxvii. p. 420.

? Daption album, Shaw, Gen. Zool., 1825, xiii. p. 246.

? Procellaria variegata, Bonnærté, fide Bp.

Procellaria vagabunda, Solander, Mss. fide Bp.

Habitat.—South Pacific and Indian Oceans.

*Form.** Bill much shorter than the skull, but slightly less than the tarsus, about two-thirds the middle toe and claw; very robust, as broad as high at the base, compressed in the rest of its extent. Unguis of upper mandible very large, strong, deep, convex, much decurved, the tip acute; the elevation of the unguis beginning so near the nasal tubes as to leave but a short and very concave extent of culmen proper. Lateral laminæ large, strong, wide, inflated, deep at the base; superior margin nearly straight, running obliquely downwards and forwards from the frontal feathers to the commissural edge of the unguis; its lower margin sharp, a little inflected, very convex in outline. The commissure is not very sinuate from the angle of the gape to the unguis. The under mandible has a very distinct and deep lateral sulcus, which is widened at both ends. The inferior unguis is large and strong, its tip much decurved and acute, its gonys very concave, its angle at the symphysis prominent but not acute. The outline of the inferior mandibular rami is a little concave; the interramal space is feathered nearly to the symphysis. The nasal tubes are short, broad, somewhat depressed, their outline nearly straight and ascending a little from base to apex; the latter obliquely truncated and emarginated. The frontal feathers overlap the culmen, nearly in a straight line or with a slightly convex outline; thence immediately retreating gradually backwards as they descend the sides of the bill. Those on the lower mandible do not extend further than a point perpendicularly below those on the culmen.

The wing is of the ordinary length and shape. The tail is comparatively a little shorter and less graduated than in *hæsitata*, and is contained a little more than twice in the wing from the carpal joint.

The tibiæ are feathered to within half an inch of the joint. The tarsi are short, about three-fifths the middle toe and claw, moderately stout, but little compressed, with the usual small subhexagonal reticulations. The tip of the inner claw just reaches the base of the middle one. Outer toe longer than the middle; but the tip of its claw does not quite reach to the tip of the middle one. Claws all long slender, little curved, acute, compressed, the middle one somewhat dilated on its inner edge. Hallux short, slender, straight, acute, conical, sessile.

Color. Bill pure intense black. Tarsi, and basal half or more of the toes and webs flesh-colored; yellowish when dried. Rest of toes and webs, including the whole aspect of the outer toe, blackish.

The head all around and the whole under parts are pure white. But a well-defined bar of slaty or cinereous black passes through the eye. The upper tail coverts and superior surface of the tail are clouded with light grayish cinereous. On the nape the white of the head begins to be shaded with pearly gray which deepens as it descends adown the back of the neck on the interscapulars and dorsal parts generally into grayish slate; which again lightens on the rump. This color varies much as to intensity or dilution; but is never as dark as the wings. Both surfaces of the wings are deep slaty black: the greater coverts inclining to dark slaty gray: the under surface rather duller in color than the upper; the prevailing color changing gradually

*These descriptions of old and young are from specimens in the Philadelphia Academy and Smithsonian Institution.

into dull brownish gray on the edges of the inner webs of the primaries. Some of the under wing coverts are edged and tipped with grayish white. A few of the long axillars are chiefly white with their terminal portions slaty.

The preceding description is taken from a specimen from the South Indian Ocean, mentioned by Mr. Cassin in the Proceedings, as above cited. The following is from one of the specimens taken by Mr. Peale, one of the naturalists of the United States Exploring Expedition under Com. Wilkes. The specimen in question is labelled in Mr. Cassin's hand-writing "*P. Lessonii* Garnot:" and while absolutely identical in form with the species as usually known and recognized presents the following exceedingly different colors:—

Young. No. 15709, Smiths. Register. Terra del Fuego, T. R. Peale. Entire upper parts dusky fuliginous brown; the dorsal feathers usually with somewhat light margins; the color deepening on the wings and tail into brownish black. Some of the secondaries, tertials and upper coverts have a slight cinereous tinge. On the head and nape the brown is lighter than elsewhere; and a somewhat diluted shade of this color extends adown the throat, thus completely enveloping the head: and occupies likewise the upper half of the breast, quite across, as well as all the sides under the wings. On the crissum, and especially on all the under tail coverts except immediately around the anus, the color again deepens into brownish black. The rest of the under parts are white. The circumocular region is darker than the adjacent parts.

The foregoing is the most immature plumage known to me, and it will be noticed that not only the colors themselves, but the pattern of coloration is radically distinct from those of the adults. In some specimens is recognizable a faint shade of a darker color on the tips of the feathers of the otherwise white under parts; whence I infer that in very young birds the whole under parts may be brownish or grayish.

Dimensions. Chord of culmen 1·50; width or height at base ·60; nasal tubes ·25; from feathers on side of lower mandible to its tip 1·15; along rictus 2·00. Tarsus 1·65; middle toe and claw 2·50; outer do. 2·40; inner do. 2·10. Wing 11·50 to 12·00. Tail 5·00 to 5·50. Graduation of lateral feathers rather more than an inch.

Synonyma. Among the older authors, I only find one name—*alba*, of Gmelin and Latham—which seems at all referrible to this species. *P. alba* is evidently an *Æstrelata*, of about the size of *Lessoni*, and the colors as described apply tolerably well to a somewhat immature example of this species. But there is nothing in the diagnoses of either of these authors which absolutely restricts the name to the *P. Lessoni;* and, therefore, in the uncertainty, I would by no means supersede M. Garnot's appellation *Lessoni*, the description of which is quite pertinent. I believe Mr. Cassin, in the Proceedings of the Philadelphia Academy, as above, was the first to refer the bird to its proper genus.

The *Procellaria leucocephala* of Forster is certainly this species. His description is in every respect pertinent to the adult bird. Although the name had been used, in manuscript, as applied to Drawing No. 98, for many years, it was not published until 1844, and, consequently is antedated by *Lessoni* of Garnot, (1826). Forster's editor, Dr. Lichtenstein, says, probably correctly, that *leucocephala* Forst. is the *alba* Gm.; but certainly incorrectly that "vix nisi ætate differre videtur a *Proc. hæsitata* Forst.;" whereas *hæsitata* Forst. is not even congeneric with *leuc cephala.*

I am unable to discuss the synonyms *variegata*, Bonnærté, and *vagabunda* Solander, which I quote on the authority of Bonaparte.

ÆSTRELATA ROSTRATA (Peale) Gray.

Procellaria rostrata, Peale, Zool. U. S. Expl. Exped. 1848, p. 296. Cassin. Ornith. U. S. Expl. Exped. 1858, p. 412.
Rhantistes rostrata, Bp. Compt. Rend. 1856, xlii. p. 768.

Procellaria (*Æstrelata*) *rostrata*, G. R. Gray, Cat. Bds. Pacif. Isl. 1859, p. 56.

Habitat.—Tahiti. (Peale.)

The following detailed description of this little known and hardly recognized species is taken from Mr. Peale's type specimen, now before me.

Form.—The bill is much shorter than the head or tarsus, about two-thirds the middle toe without its claw; exceedingly robust, especially at the base where it is as high as broad, and where its height is nearly equal to half the length of the culmen. The lateral laminæ of the upper mandible are very wide and large; especially basally, where their upper margins rise so high as to be nearly on a level with the dorsum of the nasal case, the tubes being thus almost buried between the laminæ. In consequence of this shape of the lateral laminæ the sulcus is extremely sinuate, extending from the top of the root of the nasal case to the commissural edge of the unguis, near its middle. The inferior edge of the laminæ, forming in great part the cutting edge of the upper mandible, is decidedly convex in outline. The unguis is large and strong, and its elevation, which begins almost directly from the termination of the nasal case, as well as its convexity and decurvation, are very great. The under mandible is straight, its sulcus strongly pronounced, its tip decurved and acute, its unguis large, its gonys quite concave, though there is but a slight protuberance at the symphysis.

The nasal tube is short, wide, depressed, turgid, not carinated, convex in outline both antero-posteriorly and transversely; its apex obliquely truncated, broad, depressed, not emarginated, the nares circular, separated from each other by a rather thick septum which comes forward to the very end of the nasal case. The frontal feathers encroach far upon the dorsum of the tubes, with a rounded termination, and then slope gradually backwards and downwards.* The feathers on the sides of the lower mandible do not extend to a point perpendicularly below the apex of the frontal feathers.

The wings are long, the first primary considerably surpassing the second; and when folded they reach considerably beyond the end of the tail. The latter is of moderate length, contained rather more than twice in the length of the wing from the carpus; and it is much graduated in shape.

The feet are comparatively large for the size of the bird, absolutely about equalling those of *Lessoni*, which is a larger bird. The relative proportions of the tarsus and toes are much the same as in other species. The hallux is rather long, slender and acute.

Dimensions.—Length about 14 inches, "extent 39·50," (*Peale.*) Wing 11; tail 4·75; bill along chord of culmen 1·37; heighth or width at base ·66; nasal tubes ·25; from feathers on side of lower mandible to its tip 1·20. Tarsus 1·75; middle toe and claw 2·25, outer do. 2·12; inner do. 1·80; hallux ·25. From apex of longest secondary to tip of longest primary in the closed wing 3·25.

Color.—Entire upper parts pure deep blackish brown, including the under surfaces of the wings and tail feathers; everywhere of a nearly uniform tint; but a little darkest on the outer webs and tips of the primaries, and somewhat lighter on their inner webs, especially towards their bases. This color of the upper parts extends around the sides of the head, neck and breast; but becomes on the chin, throat and breast a little paler; and includes the sides under the wings, and crissum. Rest of under parts, including the under tail coverts, pure white; the latter however have a few isolated brownish streaks. The line of demarcation between the dark and light colors on the breast is not very trenchant. The bill is black. The tarsi are pale yellow; probably flesh colored in life. A small space on the lower part of their external aspect, and the whole toes and webs (except a small yellow spot on the inner web near its base) are black.

This color of the upper parts is a pure very dark *brown*, with no mixture

*This outline of the feathers on the bill shows an approach to that seen in *Pagodroma*, and is quite different from anything that obtains in the other species of the genus *Æstrelata*.

whatever of ashen, gray or plumbeous. The distribution of colors is almost exactly that of the species of *Cataractes*.

I do not think that the plumage above given is that of the adult; it so closely resembles that of the immature *Æ. Lessoni*, which is its nearest ally. It is the only one, however, of which we have at present any knowledge.

I think it most probable that this is a valid species. There is none to which it bears any very intimate resemblance, except *Æ. incerta* and *Æ. Lessoni*. The relationships of the former will be noticed elsewhere. Compared with a young *Æ. Lessoni*, in which the size and pattern of coloration are not widely diverse, I find them to differ as follows: The upper parts of *rostrata* are of a deeper, purer brown. The under tail coverts are almost wholly white; those of *Lessoni* wholly dark colored except immediately about the anus. *Rostrata* is a smaller bird, the wing being an inch, the tail rather more than an inch shorter; but the feet are absolutely of the same size, and therefore comparatively larger. The bills of the two birds are nearly of the same length; but the radical difference in the character of the nasal tubes, the degree of turgidity of the base, and the outline of the feathers, as will be evident on comparing the descriptions given, at once distinguish them.

It is quite possible that some of the indications of older authors may have reference to this species; but in the utter impossibility of establishing any such with certainty I think it best to assign no synonym whatever.

ÆSTRELATA PARVIROSTRIS (Peale) Coues.

Procellaria parvirostris, Peale, Zool. U. S. Expl. Exp. 1848, p. 298 Cassin, Ornith. U. S. Expl. Exped. 1858, p. 411. G. R. Gray, Cat. Birds Pacif. Isl. 1859, p. 56.

Rhantistes parvirostris, Bp. C. R. 1856, lxii. p. 768.

Habitat.—Honden Island.

As in the case of *Æ. rostrata* I describe this supposed species from Mr. Peale's type specimen.

Form.—Bill much shorter than the head, but very little less than the tarsus, about two-thirds the middle toe; slender, compressed, considerably higher than broad at the base; its lateral outline about straight. Nasal tubes much as in *mollis*.* A considerable concavity of culmen between the nares and the elevation of the unguis; which latter does not rise very high, but is nevertheless very convex; much decurved, attenuated and hooked. Sulcus on side of the upper mandible curved, its convexity looking downwards, and greatest near the base of the bill, where the lateral laminæ rise high up to embrace the roots of the nasal case. Commissural edge of upper mandible strongly sinuated. Lower mandible almost exactly as in *mollis*; perhaps a trifle slenderer. Outline of feathers on base of bill just as in *mollis*.

The wings are exceedingly long, when folded much surpassing the tail. First and second primaries about equal and longest. Tail of moderate length, contained about $2\frac{1}{2}$ times in the wing. It is greatly graduated, the difference between the external and median rectrices being 1·25 inches.

The tibiæ are denuded for nearly half an inch. The plates on both sides of the tarsus are small, irregular and very numerous. The tarsus is a little more than three-fourths as long as the middle toe and claw. The usual proportionate lengths of the toes prevail. The claws are all small, weak and little curved. The hallux is minute, straight, not very acute.

Dimensions.—"Fourteen inches long, by 36 in extent," (*Peale.*) Wing 11; tail 4·50; tarsus 1·25; bill 1·08; outer toe and claw 1·66. From tip of longest secondaries to end of primaries 4·25. Gradation of tail 1·25.

Colors.—Entire upper parts, including both surfaces of the wings and tail, deep fuliginous brown, (with no trace of ashy or plumbeous) becoming almost black on the outer webs of the primaries, and inclining to grayish fuliginous

*The tubes of the single specimen have been so injured by pressure or otherwise that they cannot now be accurately described.

on their inner webs and towards their bases. The head, neck and breast all round are like the back, but not quite so intense in color; and the dark tint only occupies the extreme tips of the feathers; while its continuity is also interrupted by some whitish spots that show at intervals. There is no distinct line of demarcation between the dark color of the breast, and the pure white which occupies every other portion of the under parts of the bird, with the exception of a few dark brown isolated feathers along the sides under the wings and the crissum, and some streaks on the outer margins of the external under tail coverts. The bill is black; the tarsi, first digital phalanges, and included portions of interdigital membranes, are dull yellowish, but were probably flesh colored in life. The rest of the webs and toes are black.

ÆSTRELATA INCERTA (Schl.) Coues.

Procellaria incerta, Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 9.

"Wing 11 inches 5 lines; point of the wing 3 inches 9 lines. Tail: middle feathers 4 inches 10 lines; external feathers 3 inches and 3 to 5 lines. Bill: length 16 lines to 17 lines and a half; height 5 lines to 5 lines and a half. Width 6 lines to 6 lines and a half. Length of nasal tube 3 lines and a half. Tarsus 18 lines and a half. Middle toe 1 inch and 10 to 11 lines. Feet yellowish, becoming black upon the two last or the last joints of the toes, with the contained membrane. Head, neck and back brownish gray, clearer and inclining to whitish on the throat or whole under part of the neck. Back, wings and tail blackish brown. Below from the breast, white, mixed with brown on the flanks and becoming brown on the under tail coverts."

Habitat.—"Southern Oceans, New Zealand, Australia, New Caledonia." [Schlegel.]

The above is a copy of Dr. Schlegel's description of this supposed species, of which the author further says: "I have not been able to refer this species to any one hitherto described. It appears allied to the *Proc. rostrata*, Peale, * * but has the under tail coverts dark colored instead of white, and its colors generally are less brownish." It is to be deplored, that in introducing a species into so difficult a family as the present one, a more detailed description was not given.

As well as I can judge by the description, the species is about the size of *P. rostrata*, but distinguished from the latter by the different color of the under tail coverts, and a less decidedly brown tinge of the upper parts generally. It is probable also that if the bill possessed the turgidity which characterizes that of *rostrata*, together with the peculiar outline of the frontal feathers, these points would not have escaped the attention of Dr. Schlegel. The bird may pretty safely, then, be separated from *rostrata*.

I think that it is to the immature plumage of *Æstrelata Lessoni* that the species is to be referred, if it be really not valid. There were no recognized specimens of this latter species in the Museum of the Pays-Bas when *incerta* was founded. It comes in all respects exceedingly near the plumage I describe above as that of the young *Lessoni*; so much so that I fail to detect material discrepancies. Still I should not like to reduce any species founded by a competent naturalist, except by autopsy; and therefore leave it as described by its author; only desiring to call attention to the necessity of careful comparison with the plumage of the young *Lessoni*.

ÆSTRELATA NEGLECTA (Schl.) Coues.

Procellaria neglecta, Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 10.

"Colors of the plumage and of the feet as in *P. incerta*. But much smaller in size and with the shafts of the quill feathers whitish. Wing 10 inches and 6 to 11 lines; point of the wing 4 inches and 1 to 10 lines. Tail 3 inches and 8 to 11 lines. Bill: length 13 lines and a half; height 4 to 5 lines; width 5 lines and a half to 6 lines and a half. Length of nasal tubes a little over 2 lines. Tarsus 17 lines to 17 and a half. Middle toe 19 lines to 19 and a half."

Habitat.—"Pacific Ocean. Kermadec Islands. Sunday Island." [Schlegel.]

I can offer no opinion concerning this supposed species, except to state that it may possibly be, as Dr. Schlegel himself seems inclined to suspect, the *Æstrelata parvirostris*. But this latter species itself is so very near *mollis* Gould, that it may hereafter prove to be only a state of plumage of the latter.

ÆSTRELATA SOLANDRI (Gould) Coues.

Procellaria Solandri, Gould, P. Z. S., March 26, 1844, p. 57. Gould, Ann. and Mag. N. H. xiii. 1844, p. 363. Gould, Introd. Birds Aust. 1848. p. 116.
Cookilaria Solandri, Bonaparte, C. A. 1855, ii. p. 190.
Procellaria melanopus, Natterer, fide Gould. (Not of Gmelin.)

"Head, back of the neck, shoulders, primaries and tail dark brown; back, wing coverts and upper tail coverts slate-gray, each feather margined with dark brown; face and all the under surface brown, washed with gray on the abdomen; bill, tarsi, and membranes black.

"Total length 16 inches; bill $1\frac{3}{4}$; wing 12; tail $5\frac{1}{2}$; tarsi $\frac{3}{4}$; middle toe and nail $2\frac{3}{8}$."

The preceding is a copy of Mr. Gould's description of this species. This author further says of it. "This is a remarkably robust and compact bird. I shot a single individual in Bass' Straits, on the 13th of March 1839. M. Natterer thought that it might possibly be identical with the bird figured in Banks' drawings, and to which Dr. Solander has affixed the term *melanopus*, an opinion in which I cannot concur. I have accordingly named it in honor of that celebrated botanist. The specimen above described may possibly prove to be not fully adult, as the dark coloring of the under surface only occupies the extreme tips of the feathers—the basal portions of which are snow-white."

I have not enjoyed an opportunity of examining a specimen of this species, and none, so far as I am aware, are contained in any American collection. It appears to be exceedingly distinct from any other species of *Æstrelata*, if not in colors at least in proportions of bill and feet, as compared with the absolute size of the bird. The dimensions of these parts as given by Mr. Gould,—particularly the shortness of the tarsi, as compared with the lengths of the toes, are quite different from that of any other species of the genus; so much so that the bird may not be a true *Æstrelata*; upon which point however I cannot now give a definite opinion. The type of the species is doubtless, as Mr. Gould surmises, not fully adult; and when mature the dark coloring of the under parts will in all probability disappear, leaving the whole inferior regions of the body white. The unicolor pattern of the feet is diverse from the ordinary style which prevails in nearly all the species of the genus.

By Bonaparte the species is referred to his "genus" *Cookilaria*, though for what reason is not obvious, since Mr. Gould particularly notes that his species is a "remarkably robust and compact bird," while the type of "Cookilaria" is the *leucoptera* Gould; almost the very smallest and most gracefully formed species of *Æstrelata*. Dr. Schlegel's identification of *Solandri* with *grisea* of Kuhl is elsewhere commented upon.

ÆSTRELATA GRISEA (Kuhl) Coues.

Procellaria grisea, Kuhl, Mon. *Proc.* Beit. Zool. 1820, p. 144, No. 15, fig. 9. But not of Latham.* Schlegel. Mon. *Proc.* Mus. Pays-Bas. 1863, p. 12; (excluding synonymy)

*Lath. Syn. 1785, iii. part ii. p. 399, No. 4. "Size of a jack-daw; length 14 or 15 inches. Bill 2 inches long, and brown; the whole plumage black or sooty; the under wing coverts white, with black shafts; the wings rather exceed the tail in length; the forepart of the legs greenish blue. The specimen in the Leverian Museum has the chin and throat of a whitish color. Inhabits the southern hemisphere from 35° to 50°. Seems much allied to the Black Petrel." (*æquinoctialis*.)

This is a species of Latham's which has not so far as I am aware been identified by later writers; and I find it quite impossible, from the above meagre indication, to come to any definite conclusion regarding it. It is, however, in all probability some species of *Nectris*, of the *Puffinæ*: so that we need not therefore be prevented from using Kuhl's name of *grisea* for a bird of the genus *Æstrelata*.

[May,

Procellaria lugens, Forster, icon. 21, according to Kuhl. Banks, tab. 21 and 22, "ubi rostri forma optime est delineata" according to Kuhl.

"*Æstrelata inexpectata*, Forster," of Bonaparte's Conspectus, ii. p. 189. But not the true *inexpectata* of Forster which is doubtless *mollis*, Gould.

"Bill much compressed. Plumage uniform gray, darkest above, and becoming blackish on the wings. Generally similar to *mollis* of Gould, but with a more compressed bill, different colors and proportions of some parts, and the feet, including the webs, brownish in the dried state. Wing 9 1-12th inches; central tail feathers 3 11-12ths, external ones 2 11-12ths. Bill 11½ lines long: 4 high, 4½ wide. Length of nasal tube rather more than 2 lines. Tarsus 16½ lines. Middle toe 19 lines."

The preceding description is compiled from the diagnosis of a species given by Dr. Schlegel (as above cited) from the Australian seas. That writer identifies it with the *grisea* of Kuhl, and gives *Solandri* of Gould as a synonym. I am unacquainted, autoptically, with any species differing from *mollis* Gould, by the characters as given by Dr. Schlegel. That gentleman, however, has a specimen indicating such a species, and upon the competent authority of the accomplished Director of the Pays-Bas Museum, I recognize the species as distinct from *mollis*. The color of the plumage I do not think can be regarded as a constant and valid character, since some ages of *mollis* present exactly the tints described as those of *grisea*. The species must therefore be separated, if at all, by the more compressed bill, different colors of the feet, and different proportions of some of the parts. Taking Dr. Schlegel's description and specimen as the only tangible basis on which the supposed species I am now treating of rests, there are presented for our consideration the following points of synonymy.

Attentive study of Kuhl's description of the bird he calls "*grisea* L.," and examination of his figure (fig. 9) will show clearly that it is by no means the species described by Latham under the name of "Gray Petrel, *P. grisea*." Latham gives the bill as two inches long, while Kuhl's figure delineates a bill measuring just one inch along the chord of the culmen. Other discrepancies are palpable throughout. Latham's *grisea* appears to be a *Nectris*, while Kuhl's is an *Æstrelata* very near *mollis*. Kuhl himself takes occasion to note some descrepancies between his bird and Latham's.* Kuhl's expressions "rostro valde compresso; * * corpore et tectricibus alarum inferioribus cinerascente fuliginosis, pedibus pallidis" together with his measurements, are entirely pertinent to the bird whose characters are given by Dr. Schlegel; so that the only question is the distinctness of the species from *mollis*.

While I thus entirely agree with Dr. Schlegel in this identification of Kuhl's name, I can by no means assent to the referring of Mr. Gould's *P. Solandri* to this species. *P. Solandri* is certainly radically distinct; and so different in its proportions that I cannot understand how Dr. Schlegel could have reconciled it with *P. grisea*.

Dr. Kuhl (l. c.) says of the *P. lugens* of Forster (ic. 21) that he considers it the same as *grisea*; he also adduces *P. lugens* Banks, (tab. 21 and 22,) as a synonym of the latter. My quotation of these names is entirely upon Dr. Kuhl's authority.

The *Æstrelata inexpectata* of Bonaparte's Conspectus evidently belongs here rather than to the true *mollis*. The author quotes Kuhl's *grisea* as a synonym; and the diagnosis he gives presents nothing incompatible with the present species. The true *inexpectata* of Forster is, I think, *mollis*, as I attempt elsewhere to demonstrate.

As a summary of the preceding remarks I may state that if there be a spe-

*"In exemplari meo haud observari quod Lath. de inferioribus alarum tectricibus dicit."—Kuhl, p. 144.

cies of *Æstrelata*, closely allied to *mollis* but permanently differing from it by those characters laid down by Dr. Schlegel, and of which the specimen in the Museum of the Pays-Bas is an example, then the synonyms adduced at the head of this article are most properly to be referred to this species; but otherwise they must be considered as appertaining to *mollis*.

ÆSTRELATA MOLLIS (Gould) Coues.

? Procellaria melanopus,* Gm. S. N. i. p. 562. Lath. Syn. iii. p. 409, No. 12. Vieill. Nouv. Dict. xxvi. 1817, p. 420. *? Puffinus melanopus* Steph. Zool. xiii. p. 231.

Procellaria inexpectata, Forster, Descr. Anim. ed Licht. 1844, p. 204, No. 177. Not *Æstrelata inexpectata* of Bp. Consp. which rather appertains to the "*grisea* Kuhl" of this paper.

Procellaria mollis, Gould, Ann. et Mag. N. H. 1844, xiii. p. 363. Id. Birds Aust. vii. pl. 50. Cassin U. S. Ex. Exped. Ornith. 1858, 410. Schlegel, Mon. Proc. Mus. Pays-Bas, 1863, p. 11.—And of later authors generally.

Cookilaria mollis, Bonaparte, C. A. 1855, ii. p. 190.

Rhantistes mollis, Bonaparte, Comptes Rendus, xlii. 1856, p. 768.

? Procellaria gularis,† Peale, Zool. U. S. Expl. Exped. 1848, p. 299.

? Procellaria Phillipii, G. R. Gray, Ibis, 1862, iv. p. 246.

? P. crepidata; P sandaliata, Solander, according to Bp.

Habitat.—South Pacific and Antarctic Oceans.

Form.‡ Bill as long or slightly less than the tarsus, nearly equal to the middle toe without its claw; compressed, a little higher than broad at the base. In the details of its shape it does not differ from the typical species of *Æstrelata*. The proportions of tarsus and toes are also as in other species of the genus. The tail is only moderately rounded, instead of being decidedly cuneate with some projection of the median rectrices, as in *Æ. hæsitata;* its length is contained in that of the wing from the carpal joint slightly more than twice. The folded wings reach considerably beyond the tail. The species in size and general contour of the body approaches *Daption capensis*.

I do not notice that the plumage is softer, fuller, or more mollipilose than in some other species of the genus.

Color. There is a transocular black fascia, the greater part of which lies below the eye. The clear ashy gray of the upper parts extends over the vertex, becoming more or less mixed with white on the front and cheeks, according to age. Most of the feathers of the back have slightly paler margins. The primaries are nearly concolor in all their extent; (compare description of No. 15,706 Smithsonian Collection, infrà;) being only a little duller or more fuliginous on their inner webs. The under surface of the wing is chiefly dusky brownish; but there is an illy-defined and interrupted area of whitish, particularly towards the bases of the primaries. The upper tail coverts and tail are chiefly concolor with the back; but some of the outer rectrices are marbled with white.

In the majority of specimens the color of the back extends on the sides of the breast for a considerable distance; sometimes quite across the middle; but in very adult birds most of the breast is pure white. The color is produced by a clouding of the tips only of the feathers, their basal portions be-

* The following is Gmelin's diagnosis: "13 pollices longa. Vertex, cauda rotundata, et alæ totæ obscuré nigræ; dorsum ex atro paulisper canescens; membrana digitos connectens parte sui ulteriore, digitorumque articuli, nigri.

† *Peale, as above.* "Above cinereous brown; tail and breast plumbeous; throat, under wing coverts and under tail coverts white. Primaries and spurious quills nearly black with brown shafts; tail light beneath: two outer feathers mottled with white, * * whole under plumage white at the ro ts; bill blue-black. Length 13; extent 34; wing from carpal joint 10½; bill one inch; tarsi 1·20; outer toe 1·60; tail 3·40."

‡ Description from typical examples, received from Mr. Gould, in the Philadelphia Academy.

ing white; and often is not uniform in tint, but is minutely undulated or punctulated with lighter and darker shades.

The front, lores, lower part of cheeks, and whole under parts, including the lower tail coverts, are white. The lateral rectrices are on their inferior aspect chiefly white, with some light cinereous marbling.

In general terms it may be stated that the older the bird, the clearer and purer is the cinereous, and the more trenchantly defined are the boundaries of the several differently colored areas; the difference in this respect being especially notable in the forehead and sides of the breast.

Young birds are all over of a pretty uniform deep brownish ash, or fuliginous cinereous; inclining to smoky brown on the wings and tail. The whole under parts are not notably different from the back, though, however, the dark color only occupies the tips of the feathers; their basal moiety remaining white. The transocular dark fascia is always present. But the chin and face are much mottled with whitish; and in specimens otherwise wholly dark on the under parts, the chin and throat may be chiefly white, striatulated with ashy brown.

Moulting specimens, or those in poor plumage from the age and worn condition of the feathers, show scarcely a trace of cinereous on the wings and tail, these parts being of a dull brownish, more or less tending to gray. The same tendency to brownish or grayish instead of cinereous is observable on other parts. Sometimes a pure white chin and throat coëxists with complete dusky clouding of the other under parts.*

The bill and feet hardly differ in color with age. The bill is black; the tarsus, basal half of inner toe and contained web, flesh colored; (dull yellowish when dry;) all the rest of the toes and webs, with all the claws, black.

Dimensions. (No. 1678, Phila. Acad., J. Gould.) Bill (chord of culmen) 1·10. Height at base ·45; width slightly less. Tarsus 1·33. Outer toe and claw 1·75; middle about the same, inner 1·50. Wing average 10·00; but may range from 9·50 to 10·50; tail 4·50; the graduation of the rectrices about 1·30. These are nearly the average dimensions of six examples.

There is a specimen, No. 15,706, in the Smithsonian Museum from the Antarctic Ocean, by Mr. T. R. Peale, which, with the size and general appearance of *mollis* differs as follows: The under surfaces of the wings are, except just along the edges, purely and uninterruptedly white; as much so as in *Cookii*. The inner vanes of all the primaries, instead of being simply duller and grayer than the outer, have trenchantly defined pure white areas; these white spaces occupy the whole of the webs at the base; as they extend more towards the apex they become less wide, leaving a narrow space of dark color along the inside of the shafts; apically they terminate with an acutely pointed outline, which stretches towards the tip of the feather, and is bounded internally and externally by dark colored portions of the feather. The general pattern is exactly that seen in the primaries of most *Lari;* and the definition of the two colored areas is as strict. In other respects the bird is like a quite young *mollis*, being dark colored both above and below; but the tint of the clouding below is more intensely sooty than in any specimen of typical *mollis* I have seen; and there is this peculiarity in addition, that the under tail coverts remain pure white.

I do not wish to introduce a new name upon the above basis; though possibly in any other family than the very one of the Petrels I would do so. The points which would constitute its specific characters are elucidated in the preceding paragraph; and should the differences above pointed out be substantiated as persistent in other specimens, it would, I think, then be proper for the ornithologist who makes the verification to forma ly introduce the species. The specimen in question before me is the only one contained in the United

* In which condition is the type of "*gularis*," Peale.

States Wilkes' Exploring Expedition collection; and is, therefore, in all probability, the very individual upon which Mr. Peale based his description of *gularis*; which name should, therefore, stand for the species, in the event of its proving valid; even though Peale's description does not notice the peculiar markings of the primaries.

Bibliography. It is possible that the *P. melanopus* of Gmelin and Latham was based upon this species. Their bird evidently was an *Æstrelata*, and "thirteen inches long;" and the description of the colors would apply pretty well to an immature *mollis*. But *mollis* has a bill by no means an inch and a half long; and is not found, so far as we know, "circa Americani septentrionalis." The only known North American species of *Æstrelata* is the *hæsitata*; of which the bill is nearly of the length stated by Latham. Under the circumstances, I do not think this name is to be adopted for ei her species.

I think there can be no doubt that the *inexpectata* of Forster is really this species. I find no points of the description, nor any of the measurements, at all incompatible with this supposition. Dr. Lichtenstein refers *inexpectata* to *grisea* of Gmelin; certainly incorrectly, whatever may be its relations to *grisea* of Kuhl.

The name *mollis* Gould bears the same date of publication as *inexpectata*, (1844): so that it is difficult to say which actually has priority. I think, if any choice is allowed us, we should, by all means, use *mollis*, so definitely characterized and well known. Mr. Gould, in describing the species, says that it had been identified with *lugens* of Banks, and with *grisea* of Kuhl (nec Gm.) This may very possibly be the case; although, for the present, I give *grisea* Kuhl, (of which *lugens* Banks is a synonym,) as a distinct species, for reasons stated elsewhere.

In the Ibis, as above, Mr. G. R. Gray has a species *P. Phillipii* from Norfolk Island; based upon the "Norfolk Island Petrel," Phill. Bot. Bay, p. 161; with *P. alba*, var. Lath., and *P. mollis* Gould, as synonyms, the latter queried. No description is given, and I merely follow Gray himself, in placing the name as a queried synonym of *mollis*. Vieillot, (Nouv. Dict., xxvi. 1817, p. 420,) refers to this same "Norfolk Island Petrel."

ÆSTRELATA COOKII (Gray) Coues.

Procellaria Cookii, G. R. Gray, Fn. N. Z. App. Dieff. Trav., 1843, ii. p. 199.—Id. Voy. Ereb. and Terror, pt. iii. 1844, pl. 35.—Id. Sclater's Ibis, 1862, iv. p. 246. Cassin, U. S. Expl. Exped. Ornith., 1858, p. 414, and of authors.

Rhantistes Cookii, Bonap. Compt. Rend. xlii. p. 768.

Procellaria leucoptera, Gould, P. Z. S. xxii. 1844, p. 57.—Id. Ann. Mag. N. H. xiii. 1844, p. 364.—Id. Birds Aust. pl. 51.

Cookilaria leucoptera, Bonap. C. A. 1855, ii. p. 190.

Cookilaria velox, Bonap. C. A., 1855, ii. p. 190, ex *Pr. velox* of Solander. Not *velox* of Banks, supposed to be one of the *Prioneæ*.

Rhantistes velox, Bonaparte, Compt. Rend. xlii. 1856, p. 768.

Procellaria brevipes,* Peale, Zool. U. S. Ex. Ex. Bds., 1848, p. 294.

Habitat.—Southern Oceans, at large.

Form.† Bill much compressed, except at the extreme base, where it is nearly as wide as high; much shorter than the skull; about equal to the tarsus; one of the most slender in general shape of this genus. The lateral superior sulcus is nearly straight, being only a little sinuate; the outline of the inferior mandibular rami and of the gonys both a little concave, the pro-

* *Peale, as above.* "Head and wings sooty black; tail and back gray; throat, breast, and belly white, tinged with salmon color when living; interrupted plumbeous band across the breast; two outer tail feathers light gray, white beneath; shafts white; all the others brown; under wing coverts white; lesser ones nearly black. Bill black; feet pale flesh; toes black at their ends. Length 10·70; extent 24·25; culmen nineteen-twentieths; middle toe and claw 1.30."

† From specs. in Philada. Acad. and Mus. Smithson.

tuberance at the symphysis acute, if not very prominent. The commissure is, as usual, very sinuate. The nasal case is contained nearly four times in the length of the culmen; broad, depressed, its dorsal outline straight, its apex very obliquely truncated, its orifice subcircular, each naris oval; the septum of considerable thickness, and coming forward to the very end of the case. The frontal feathers do not extend at all forward on the base of the culmen, but embrace the sides of the bill as extensively as they do its base above; and thence they slope very rapidly backwards, making a considerable angle just above the edge of the commissure.

The wings are sufficiently elongated to extend, when folded, a little beyond the end of the tail, which is, itself, rather longer than in most species of this group. The second primary is nearly as long as the first; the rest are rapidly graduated.

The tail is so long as to be only contained exactly twice in the length of the wing from the carpus, and the graduation of the lateral feathers is about as great as in *hæsitata*, (greater than in *mollis*,) though the median pair of rectrices are not specially produced. The upper tail coverts fall far short of the end of the tail: the under ones reach quite to it.

The legs are short and slender; the tibiæ bare for but a very brief space. The tarsi are considerably shorter than the middle toe without its claw, and about equal to the inner; quite slender, moderately compressed, with the ordinary recticulations. The tip of the inner lateral claw just reaches the base of the middle one. The middle and outer toes are of equal length, but the claw of the latter is much shorter than that of the former: which last is but very slightly dilated on its inner edge. All the claws are small, slender and weak, but still much curved and acute. The hallux is of the ordinary size and shape.

Dimensions. Chord of culmen 1·00; height of bill at base ·35 to ·40. Length of nasal case ·25. Wing 8·50 to 9·00; the distance from end of longest secondary to tip of first primary in the folded wing 2·75. Tail 3·75 to 4·25; graduation 1·00 to 1·50. Tarsus 1·10; outer toe and claw 1·25; inner do. 1·12, middle do. 1·33. From upper tail coverts to end of tail 1·40.

Color. Adult. Above blackish cinereous. On the crown of the head and its sides to a little below and before the eye, and on the nape the color tends more towards sooty brownish than to cinereous; but on the neck behind this color merges insensibly into the quite pure deep cinereous, which occupies the middle dorsal region, the interscapulars, and some of the tertials. The rump is darker and more like the crown; the upper tail coverts again being cinereous, if anything a little lighter than the back—tending to pure grayish instead of dusky cinereous. The superior surface of the tail is plumbeous blackish, lightest and most cinereous basally. Inferiorly the tail is lighter colored than on its upper surface; the lateral rectrices particularly being light plumbeous gray, almost whitish basally. The shafts of the feathers are above brown, below white, except at their extremities. The superior wing coverts and all the primaries and secondaries are brownish or fuliginous black; deepest along the edges of the wings, and outer borders and tips of the quill feathers. The inner vanes of the primaries are light grayish fuliginous, becoming grayish white towards their bases; but the transition is quite gradual. The shafts are black above, brownish beneath. All the under wing coverts are pure white, except one row, the smallest, just along the edge of the ulna and metacarpus; producing a broad uninterrupted white area. On the radial edge of the antibrachium there is a narrow but well-defined white line:* visible from both upper and under aspects of the

* This is very erroneously called a "linea *humeralis*" by Mr. Gould in one place; and spoken of as "a line along the inner edge of the *shoulder*" in another. We very often find the carpal joint most carelessly and incorrectly spoken of as the "shoulder."

wing. The front, the lores, the sides of the head nearly to the eyes; the side of the neck, and the whole under plumage, pure white. The color of the back almost always, to some degree, clouds the sides of the breast.

The above is the plumage of a very mature bird. Usually the plumage is rather as follows. The upper parts generally are less decidedly cinereous—having more of an admixture of brownish—though the upper tail coverts are quite notably plumbeous. The forehead is speckled with black: sometimes the latter color being in excess over the white. The sides of the breast are very strongly clouded with dark cinereous gray, which may reach quite to the median line; though this color is only a wash on the extremities of the feathers. Some of the feathers on the flanks, and a few of the under tail coverts are also lightly touched with plumbeous gray.

Young. The upper parts show scarcely a trace of cinereous anywhere, except, perhaps, on the upper tail coverts. The front is so much obscured by dusky that the white only appears in small sparse specks. The whole under parts are tinged with a plumbeous black hue from the breast backwards; this color being deepest on the breast where it is pure and uninterrupted; on other parts appearing as a clouding or marbling. The chin and throat in all the specimens I have seen remain almost pure white, in marked contrast to the rest of the under parts. The under wing coverts are as described in the adult: and the white line along the edge of the fore arm also exists.

It will be noted that the changes of plumage above described are quite homologous with those to which *mollis* is subject.

The bill is black. Somewhat more than half the inner web, and rather less than half the outer web, together with the tarsus, are light flesh color. The rest of the toes and webs are black. The colors of the bill and feet seem subject to little variation with age.

Synonyma. The name *Cookii* of Gray has priority by about a year over *leucoptera* of Gould; as, indeed, the latter author himself allows. That these two names were based upon the same species is not doubted, so far as I can learn, except by one author. Bonaparte would have it that the bird figured in plate 51 of the Birds of Australia, and called "*Cookii* Gray" by Mr. Gould, is not the species really so named by Mr. Gray; but another; differing slightly in size, though quite identical in color, and for which he adopts the name *velox*. In this conclusion, he is quite unsustained by ornithologists.

The specimen collected by Mr. T. R. Peale, now before me, which doubtless is the type of his *brevipes* of 1848, is an example of this species.

This little species is liable to be confounded with no other, except, perhaps, the succeeding one; under the head of which latter the apparent differences are noticed. I find no names of the older writers which seem referrible to this species; and its synonymy is less confused than that of most other components of the genus.

Æstrelata gavia (Forst.)

Procellaria gavia, Forst. Descr. Anim. Ed. Licht., 1844, p. 148. ("P. suprâ cœrulescenti-nigra, subtus candida, palato et linguâ villis deflexis, pedibus pallide-fuscis. * * Habitat ad Æstuarium Reginæ Charlottæ. * * Corpus magnitudine circiter *P. vittatæ*. * * Alae expansæ 26 unc. rostrum in fronte 1·50; tibiæ 1·75; cauda 2·50." Forst.) G. R. Gray, Voy. Ereb. and Terr. Birds, pt. x. Oct., 1845, p. 18.—Id. Ibis, 1862, iv. p. 246. From Queen Charlotte's Sound.

This is a species which is not recognized, and, in fact, does not appear to be noticed in later systematic works. In addition to the diagnostic points quoted above, Forster describes it as having the pileum, neck behind, back, rump, thighs, tail, and upper surface of the wings, bluish black; the chin,

throat, breast, abdomen, crissum and under wing coverts white. Forster's editor, Dr. Lichtenstein, merely says of it, "inter *P. albæ* Lath. varietates latens." Mr. G. R. Gray recognizes it in the works above cited as a valid species. An accurate definition of its characters, and an exact exposition of its relationships, together with its synonyms, if it have any, are greatly to be desired.

The bird is apparently some small species of *Æstrelata*. All the points of coloration given, especially those of the under wing coverts, are quite consistent with the characters of *Æ. Cookii*. But the dimensions as stated are quite at variance with those presented by *Cookii*, those of the bill and feet being much too large, while that of the tail is too small; these dimensions being rather those of a small *Puffinus*. In view of these discrepancies, I prefer to coincide with Mr. Gray's high authority in holding it, for the present at least, as distinct; especially as its reference to any described species would be entirely upon supposition.

ÆSTRELATA DESOLATA (Gm.) Bon.

Procellaria desolata, Gmelin, Syst. Nat. i. pars. ii. 1788, p. 562, No. 14. Latham, Syn. iii. part ii. 1785, p. 409, No. 14. Latham, Ind. Orn., 1790, ii. p. 825, No. . Kuhl, Mon. *Proc.* Beit. Zool, 1820, p. 143, No. 13, fig. 7. Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 13; and of authors generally.

Daption desolatum, Steph. Shaw's Gen. Zool. xiii. 1825, p. 244.

Æstrelata desolata, Bonaparte, Consp. Av. ii. p. 189. Excl. var. *rostrata*.—Id. Comptes Rend. xlii. 1856, p. 768.

Procellaria fasciata, Bonnærté, (Gray, Cat. Bds. Pacif. Islands, 1859, p. 56).

Habitat.—Island of Desolation. New Hebrides; Kamtschatka, (Schlegel).

"Pr. ex virescente cinerea, subtus alba, remigibus caudâque rotundatâ obscuris, hac apice fuscâ. * * Rostrum nigrum apice flavicans; tempora ocularumque area alba. Summitas alarum ferè nigra; pedes fusci; membrana digitos connectens flava; ungues nigri; alis expansis fasciâ obscurâ per omne corpus ab apice ad apicem." [*Gmelin.*]

"Teintes du plumage et des pieds absolument comme celles de la *Procellaria leucoptera*, mais d'une taille beaucoup moins forte, et les pennes caudales comme les plumes sous-caudales d'une teinte foncée jusqu'à leur base. Aile 7 pouces 10 lignes; pointe de l'aile 2 pouces 11 lignes. Queue: pennes mitoyennes 3 pouces 5 lines; pennes externes 2 pouces 8 lignes. Bec: longeur 11 lignes; hauteur 3 lignes; largeur 4 lignes. Longueur du tube nasal à-peu-près de 2 lignes. Tarse 12 lignes. Doigt du mileau 12 lignes." (*Schlegel.*)

This is a species with which I am unacquainted through autopsy. It is the smallest known component of the genus, being less than the little *Cookii*. I have copied Gmelin's original indication of the species; and Dr. Schlegel's measurements of a typical example, from the Temminckian collection; the individual upon which Dr. Kuhl, in 1820, based his description. Both Gmelin and Latham speak of some portion of the bill as being yellow; which was probably an accidental feature in one specimen; for, as is well known, all the *Æstrelatas* have black bills.

This species is so small, and otherwise so well characterized, that it stands in the enviable position of having hardly a synonym, although described in the eighteenth century. I have not met with, or seen anywhere cited, a single synonym, except that of Bonnærté, above given.

ÆSTRELATA MACROPTERA (Smith) Coues.

Procellaria macroptera, Smith, Ill. S. Af. Zool. Bds., pl. 52. Gould, Ann. Mag. N. H., 1844, xiii. p. 362. Gould, Introd. Bds. Aust., p. 116, No. 591.

Ossifraga macroptera, Reichenbach, Syst. Av. t. 21, fig. 786.

Pterodroma macroptera, Bp. C. A., 1855, ii. p. 191.
Procellaria brevirostris, Lesson, Traité Orn., 1831, p. 611.
"*? Procellaria lugubris*, Tschudi," according to Bonaparte. Not of Natterer, which is a *Thalassidromine*.

Habitat.—Antarctic Oceans. Coast of Africa. (Smith). Van Diemen's Land. (Gould).

This is a species which I recognize with much doubt. Not having access to the original description by Smith, I cannot speak with certainty regarding it. It is admitted by Bonaparte, who says of it: "Ex toto fuliginoso-cinerea; rostro nigro; pedibus flavidis." On the other hand, Dr. Schlegel refers it to the *atlantica;* and the measurements of two specimens in the Pays-Bas Museum, (one an undoubted *atlantica* received from Mr. Gould, and the other a supposed *macroptera*,) by no means differ in size to a degree incompatible with specific identity. If the expression "pedibus flavidis" is correct, the species would be easily separable. As it is, the only data given by most authors are the larger size, longer wings, and grayer face, as compared with *atlantica*.

It is quite possible that the specimen upon which Dr. Schlegel unites the two names is not a veritable example of *macroptera*. Bonaparte evidently separates *macroptera* from *atlantica* on the strength of the difference in the color of the feet. Mr. Gould says of this species: "I think that a bird I killed in the seas off Van Diemen's Land, where it was tolerably abundant, and which differs from *atlantica* in being of a larger size, having much longer wings and a grayer face, may be identical with *P. macroptera* of Smith, and I therefore retain it under that appellation, in preference to assigning it a new name." Here is an instance in which an author who, in extensive and practical knowledge of the Petrels, is surpassed by no other naturalist, deems the species sufficiently distinct from *atlantica*. But it is quite possible that the bird here referred to is not the true *macroptera* of Smith; and may likely enough be an undescribed species of *Pterodroma*, different from both *macroptera* and *atlantica*, as, indeed, Bonaparte hints, (page 191, Conspectus).

On page 611 of Lesson's Traité,' (1831,) there is described a *Procellaria brevirostris*, as follows: "Bec noir, court, tres recourbé; tarses jaune; plumage en entier brun fuligineux; ailes et queue noir intense. Mus. de Paris." This is evidently some species of *Pterodroma;* and upon this description, apparently, or, very possibly, upon the specimen itself in the Paris Museum, Bonaparte has drawn up his diagnosis of the species he calls "*macroptera* Smith." I cannot see why he does not employ Lesson's name, which has priority over *macroptera* Smith, provided the two are synonymous.

As a resumé of the subject, I may state that I think it quite possible there are two species confounded in the synonyma at the head of this article. One is *brevirostris* Lesson, entirely fuliginous, and with yellow feet. The other is the species referred to by Mr. Gould, as above, as distinguished from the common *atlantica* by its larger size, longer wings, and gray face. Whether the latter is the true *macroptera* of Smith remains to be proven. Dr. Schlegel may be perfectly right in referring the *macroptera* Smith to *atlantica* Gould; and yet the two species I am speaking of may also exist, distinct from each other and from *atlantica*.

By Bonaparte the *Procellaria lugubris Tschudi** is referred with a query to this species. As will be seen by the accompanying foot-note, the bird is evidently some species of *Pterodroma*; though the description is so brief and wanting in measurements that it is impossible to say to which one it is to be referred, or whether it be really a valid new species.

* Tschudi, Cab. Journ. f. Ornith., iv. 1856, p. 85. "The whole body is dark brown, the back somewhat deeper-colored than the belly; the tail wholly black; the inner side of the wing darker than the outer. Bill and feet reddish: iris ashy gray. Surpasses in size the *capensis;* also compressed in form. The description of *P. antarctica* is too inaccurate to say with certainty if it be the species here described. Between 46° and 36°."

ÆSTRELATA FULIGINOSA (Kuhl) Coues.

Procellaria fuliginosa, Kuhl, Mon. *Proc.* Beit. Zool. 1820, p. 142, No. 12, pl. x. fig. 6.—(Banks, tab. 19, fide Kuhl; Forst. tab. 93, B. fide Gould.) But not *Proc. fuliginosa*, Kuhl, l. c. species 27, page 148, (Banks tab. 23,) which is a *Nectris*. Also not *fuliginosa* Gm. Lath. which is probably a Thalassidromine species. Also not *Puffinus fuliginosus* Strick.—Forster, Descr. Anim. Ed. Licht. 1844, p. 23, sp. 18.—Not the *Nectris fuliginosa* of Forster.—Schlegel, Mon. Proc. Mus. Pays-Bas. 1863, p. 8.

Procellaria atlantica, Gould, Ann. Mag. N. H. 1844, xiii. p. 362. Id. Introd. B. Aust. p. 116, sp. 590, and of authors.

Pterodroma atlantica, Bonaparte, C. A. 1856, ii. p. 191.

Habitat.—Atlantic Ocean, particularly its southern portions.

*Descr.** Bill black. Feet dark colored. Entire plumage including the under wing coverts, fuliginous, becoming almost black on the wings and tail. Bill 1·35. Tarsus 1·60; middle toe and claw 2·20; outer do. about the same, inner do. 2 20. Wing 10·75 to 11·50; possibly to 12·00. Tail 4·50 to 5·00. Total length 15 to 16 inches.

Fine examples of this well known species are in the Philadelphia Academy, some of them typical specimens received from Mr. Gould, and labelled by him "*atlantica.*"

This species is certainly the *fuliginosa* of Kuhl's monograph (No. 12, pl. x. fig. 6.) Indeed it is seldom that the descriptions and measurements of the earlier writers are found so entirely pertinent and readily identifiable as in the present instance. The figure of the bill agrees exactly. This identification is made by both Bonaparte and Schlegel. Although the name *fuliginosa* has been applied by several other authors to different species, none of them fall in this genus or indeed among the *Æstrelatæ*. (Examine my synonyma, *suprà.*) There would seem to be therefore no good reason why the name should not stand for this species, taking precedence over *atlantica* of Gould. To Dr. Schlegel is due, I believe, the credit of restoring Dr. Kuhl's name.

It is quite at variance with the usual great accuracy of Mr. Gould's identifications, that he should have said† that this species "is the *grisea* of Kuhl" (No. 15, fig. 9.) I have endeavored to show, anteà, what I think the *grisea* of Kuhl really is; but whether my identification—which is the same as that made by Dr. Schlegel—be correct or not, Kuhl's *grisea* is certainly widely different from the present species.

In my Review of the *Puffinæ*, page 124 of these Proceedings for 1864, I maintain the opinion that *fuliginosa*, Forster, sp. 18, p. 23, of Lichenstein's edition, is a species of *Nectris;* which view I am now satisfied is erroneous. *Procellaria fuliginosa* Forster is the present species, as maintained by Prof. Lichtenstein and Prince Bonaparte. Impressed with Kuhl's remark that his *fuliginosa* is "omnino diversa a *Nectri fuliginosa* Forst.," I did not discriminate between this latter name and the *Procellaria fuliginosa* Forst. p. 23 of Lichenstein's edition; whence my mistake.

I know nothing of the *Nectris fuliginosa* of Forster, nor do I attempt to identify *Proc. fuliginosa*, sp. 27, ("Banks tab. 23") of Dr. Kuhl's monograph. The latter has recently been identified by Mr. Gray with *Proc. pacifica* of Latham, which is some large species of *Puffinus* (Cat. Birds Pacif. Isl. p. 55.)

In the "Ibis" for 1862. page 245, Mr. G. R. Gray institutes a *Procellaria Parkinsoni;* which is said to be the bird of Bank's icon. ined. No. 19, and (in part) the *Puffinus æquinoctialis* of Gray's list of Anseres of the British Museum, page 160; and is compared with *æquinoctialis* as follows: "being smaller in all its proportions; the bill is nearly one-third less than that of *æquinoctialis;* the

*From specs. in Mus. Acad., Phila.
† Ann. Mag. N. H. 1844, xiii. p. 362.

body is sooty black throughout, being without the white on the mentum; the tips of the mandibles are inclined to black." This description does not show well whether the bird is a *Majaqueus* or a *Pterodroma;* the comparison with *æquinoctialis* would seem to indicate the former; while the citation of Banks' Drawings No. 19 (by Kuhl placed under his *P. fuliginosa*—which is the *Pterodroma atlantica*,) would make it a component of the latter group. The habitat of the supposed species is New Zealand.

Æstrelata aterrima (Verreaux) Coues.

Procellaria aterrima, Verreaux. Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 9.
Pterodroma aterrima, Bonap. C. A. 1855, ii. p. 191.
"*Bulweria aterrima*, Aliq."
"? *Proc. carbonaria*, Solander" fide Bp.

Habitat.—West coast of Africa. Bourbon Island.

A very distinct species, distinguished among its congeners by its size, and the color of the feet. The plumage as in the others of the group is uniform blackish fuliginous; the feet are yellowish, or light colored, passing into black upon the terminal moiety of the toes and the included portions of their membranes. Dr. Schlegel gives the following measurements of a typical example in the Leyden Museum, from Bourbon Island, received from Mr. Verreaux: "Wing 8 7-12 inches; point of the wing 3 5-12; middle tail feathers 3 7-12; external 2 8-12; length of bill 12½ lines; height 4½ lines; width 6 lines; tarsus 16½ lines; middle toe 17½ lines."

Æstrelata Bulweri (Jard. et Selb.) Coues.

Procellaria Bulweri, Jardine and Selby, Ill. Orn. Vol. ii. tab. 65. (No date given on title page and pages not numbered.) Schlegel, Mon. *Proc.* Mus. Pay-Bas, 1863, p. 9, and of many authors.
Thalassidroma Bulweri, Gray, Gen. Birds, 1849, iii.
Procellaria anjinho, Heineken, Birds Mad. in Brewst. Journ. Oct. 1829, p. 231. (First designation?)
Puffinus columbinus, Webb and Berthelot, Hist. Nat. Canar. ii. part ii. 1836—44, page 44, pl. 4, fig. 2. (Name *Proc. columbina* on plate.)
Bulweria columbina, Bonaparte, C. A. 1855, ii. p. 194.

Habitat.—Atlantic Ocean. Coast of Africa and Europe. Dr. Schlegel has a specimen from Greenland. Very possibly to be included in the Fauna of North America.

This interesting species is the smallest of the genus, and quite distinct from its congeners not only in size but in some of its proportions. It has comparatively a longer tail than most species of the genus; bearing a proportion to the wing from the carpal joint of 4½ to about 8, or more than half. The tail is very cuneate, the difference between the median and outer feathers amounting to 1·75 inches; and the central pair themselves are considerably longer than the next. The under tail coverts,—at least in the specimen before me,—fall nearly two inches short of the end of the longest feathers, being in fact no longer than the upper ones. The folded wings hardly reach to the end of the tail. The bill is about as long as the tarsus, or the middle toe without its claw; of the ordinary Æstrelatean type; quite stout at the base, compressed throughout; the unguis large and rising almost immediately from the nostrils, and exceedingly convex; the sulcus on the lower mandible is deep and well marked; the outline of the rami is nearly straight, the gonys very concave; and there is considerable of an eminentia symphysis. The first primary is hardly if at all longer than the second. The feet present no special peculiarities in relative size or proportions; the inner toe is perhaps slightly shorter than ordinary.

The fuliginous color is deepest, being almost black, on the wings and tail;

[May,

below is lighter and more brownish; on the head has a faint cinereous wash: on the greater wing-coverts is rather paler and grayer.*

Dimensions. Chord of culmen 0·85. Tarsus slightly longer, ·90 to 1·00; middle toe and claw 1·10; outer do. about the same; inner do. 0·85. Wing 8·00; tail 4·50; graduation of lateral feathers 1·75.

This little species has been very variously arranged in the series by different authors, as will be seen by the synonyms which head this article. In my mind there is no doubt that Dr. Schlegel has correctly indicated its affinities in placing it in intimate relation with, and next after *aterrima* Verr., albeit he retains it in his somewhat extensive "genus" *Procellaria*. My own reasons for referring it to *Æstrelata* will be found in my remarks under the head of that genus.

I am not enabled to state positively what was the first specific name applied to this species, of the three which head this article. Bonaparte gives precedence to *columbina*; but MM. Webb and Berthelot, in giving this name quote *anjinho*, Heineken, (1829) as above, which must therefore have been published anterior to their own appellation *columbina*. The title page of the work where the latter name appears, bears the date "1836—44." Dr. Schlegel and most other writers give priority to *Bulweri* of Jardine and Selby's Illustrations, a work extending over a series of years. It is figured in volume ii. pl. 65; but the title page bears no date. If not published anterior to 1829 then the name *anjinho* Heineken has priority.

Æstrelata Macgillivrayi (Gray) Coues.

Thalassidroma (*Bulweria*) *Macgillivrayi*, G. R. Gray, Cat. Birds Isl. Pacif. 1859, p. 56. Spec. in Britsh Museum, from the Feejee Islands, (Ngau.)

"Like *T. Bulweri*, but with the bill rather larger; and it is without the sooty brown on the wings." [Gray.]

A species with which I am only acquainted through the above cited very brief indication.

[Note.—Just as these sheets are leaving my hands for the printer's I learn through the kindness of my friend Dr. P. L. Sclater, of London, of the identification of the "Blue Mountain Duck" of Gosse's Birds of Jamaica. It appears in the Proceedings of the Zoological Society as *Pterodroma Carribæi*, Carte. I was surprised at learning that it is a "*Pterodroma*," as I had confidently anticipated that it would prove to be one of the *Prioneæ*; possibly however being prejudiced by the following note upon it by Richard Hill, Esq.† "From the dimensions of our bird, 13 inches long, by some 26 inches in the extent of wing, and from the proportions and character of the bill and nasal tubes, and the grooved mandible, I should say the *Blue mountain petrel* must be classed with the *Prion* of Lacépède, the genus *Pachyptila* of Illiger, the type being the *Procellaria vittata*, * * Our bird has a triple row of palatal teeth," etc.]

PAGODROMA Bonap.

Procellaria sp. Gmelin et Auctorum.
Thalassoica, sp. Reichenbach.
Pagodroma, Bonap. Consp. Av. 1855, ii. p. 192.—Type *Proc. nivea* Gmel.

The bill is very short, being less than half as long as the skull; and exceedingly small, weak, slender and compressed throughout, its base being much higher than broad. The lateral outlines are straight, rapidly converging to a narrow, elongated, rather slender, very convex, moderately decurved and hooked unguis, whose convexity begins immediately at the termination of the nasal case. The lateral sulcus is short, and very oblique. The outline of lower mandible is straight; of gonys a little concave, the angle of the sym-

* Description from specs. in the Philada. Acad. and Mus. Smithson.
† A week at Port-Royal. By Richard Hill. Montego Bay, 1855.

physis slight, the tip a little decurved. The interramal space is narrow, and densely feathered to the symphysis. The nasal tubes are exceedingly short, but broad, high, and turgid, the median line only obsoletely carinated. Their apex is very obliquely truncated, not at all emarginated. The orifice is large, and nearly circular; the internasal septum very thin, and not extending to the termination of the nasal case. The frontal feathers extend far on the base of the bill, running forward on the nasal case with a narrowly rounded termination, and sloping rapidly backwards and obliquely downwards. The outline of the base of the nasal tubes is thus rendered nearly as oblique as their apex.

The wings are rather short, when folded not reaching to the end of the tail. The second primary is not much shorter than the first. All the primaries are rather narrow, regularly tapering to their somewhat acute tips. The tertials and inner primaries are much abbreviated, making the distance in the folded wing, from their tips to the end of the first primary unusually great. The tail is very long, broad, and but slightly rounded, and is contained only about twice in the wing from the carpal joint. All the rectrices are broad to their very tips; which latter are squarely truncated.

The tarsus is as long as the middle toe; moderately stout and compressed; covered with small somewhat elongated irregularly shaped plates, which are rough and elevated, especially posteriorly, and are not notably different in size or shape on the two aspects of the tarsus. The tibiæ are feathered to very near the joint. The inner lateral toe with its claw barely reaches the base of the middle claw. The outer lateral toe is longer than the middle; its claw however so short, as hardly to reach to the tip of the middle claw. Claws are rather large, little curved, moderately compressed and acute; the inner edge of the middle one dilated. The hallux is unusually developed, and somewhat depressed in situation; long, stout, acute, and a little curved.

The size is moderate; the form compact and robust; the color entirely pure white.

This is one of the most remarkable generic types of the *Procellariinæ*. It is doubtless most nearly related to *Daption*, with which genus its "build" corresponds closely. But, as will be seen on comparing the diagnosis given, it differs in many details of structure, particularly those relating to the bill. From *Æstrelata* the pecularities of bill, of the hallux, comparative lengths of wings and tail, etc., readily distinguish it. The genus has a "physiognomy" or "facial aspect" that is peculiarly its own. The long depressed sloping forehead is found in no other *Procellaridian*. This is produced mainly by the flattening and elongation of the bones composing the forehead; but aided to a considerable degree by the great forward extension of the frontal feathers, which gives to the bill and nasal tubes their extreme brevity; causes such a long rictus; and places the eye, apparently, at so great a distance from the corneous base of the bill.

PAGODROMA NIVEA (Gm.) Bon.

Procellaria nivea, Gm., S. N. 1788, i. part ii. p. 562, and of authors generally.
Daption niveum, Stephens, Shaw's Gen. Zool. xiii. p. 243.
Thalassoica nivea, Reichenbach, tab. 22, fig. 791, 792.
Pagodroma nivea, Bonaparte, C. A. 1855, ii. p. 192.
Procellaria candida, Peale, Zool. U. S. Expl. Exped. 1848, p. 295.
Pagodroma, var. *major*, Bonaparte, l. c.
Pagodroma, var. *minor*, Bonaparte, l. c.
Procellaria nivea minor, Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 16.

Habitat.—Antarctic Ocean and Continent.

Independently of differences in absolute size of body, the species presents unending variations in size, and, to some degree, in shape, of the bill. Specimens differ in this respect by as much as a fourth of the whole length of the

bill, which may be quite unaccompanied by corresponding differences as to depth or width. The length of the nasal tubes, and the amount of turgidity, and obliquity of truncation vary greatly. Differences in the depth and robustness of bill are surprisingly great.

I have never seen, of many specimens, any which were separable specifically from the typical form. But some individuals are so strikingly small, that were it not for intermediate sizes, they might readily be supposed distinct. Upon this character a variety *minor* was founded by Bonaparte which has been adopted by so accurate and cautious an ornithologist as Dr. Schlegel.

The only synonym of note I have met with is *candidus* of Peale, (1848.) The original description of *P. nivea* by Gmelin speaks of black shafts of some of the feathers. As Mr. Cassin justly remarks (Orn. U. S. Ex. Exped. 1858, p. 416) should this ever be found to characterize a species, the present must bear Mr. Peale's name of *candida*. I think it probable that dark spots or streaks would be indicative of inmaturity; but being unfamiliar with the plumage of very young birds, I cannot speak with certainty.

DAPTION Stephens.

Procellaria sp. Linnæus, et Auct.

Daption, Stephens, Shaw's Gen. Zool. xiii. 1825, p. 239. Type *Procellaria capensis*, L.

The bill is much shorter than the skull, about three-fourths the tarsus, rather more than two-thirds the middle toe, very stout, depressed, about as broad as high for its whole length as far as the unguis, where it is suddenly much compressed and higher than broad. Culmen is about straight or a little concave from the nostrils to the root of the unguis, which latter is moderately large, but not very convex nor much decurved. The lateral outline of the bill is decidedly convex from its base to the unguis where the convexity suddenly ceases; it is produced by the large, inflated and protuberant lateral laminæ. Just inside the cutting edge of the bill is a series of oblique rugæ, extending the whole length of the bill. The lateral sulcus is well defined, running from the base of the nasal case to the unguis, obliquely downwards and forwards; it is most distinct posteriorly, more shallow anteriorly, where it merges into the depressed portion of the culmen. The lower mandible is perpendicularly narrow, but horizontally is unusually broad, the rami widely diverging from each other immediately from the symphysis. The gonys is short, scarcely convex in outline, its angle small and inconspicuous. The interramal space is very broad, in consequence of the wide divergence of the inferior mandibular rami, and their mutual concavity. The rictus is exceedingly ample; and the capacity of the fauces increased still more by the looseness and dilatability of the enclosed skin. The feathers on the side of the lower mandible extend but a short distance; those in the interramal space only as far as a point opposite the end of the nasal tubes; and by no means fill the space from side to side when the skin is at all distended.

The nasal case is very long for a component of the group *Æstrelatæ*, being a third as long as the culmen. It is broad, depressed, a little more elevated towards the apex, its dorsal outline a little concave and moderately carinated. The orifice is subcircular, nearly vertically truncated, a little emarginated.

The wings are of moderate length, about equal to the tail when they are folded. The second primary is nearly as long as the first; the rest rapidly graduated. The tail is rather short, contained about two and a half times in the wing from the carpus; is moderately and very evenly rounded; the rectrices being broad to their extreme tips. The upper tail coverts fall an inch short of the end of the tail; the inferior ones quite reach its extremity.

But a very brief portion of the tibia is naked of feathers. The tarsus is much shorter than the middle toe and claw, about equal to the inner toe; very stout, though much compressed; covered externally with very small, irregularly subcircular plates; which on the inner aspect are much larger and more regular

in shape; the median series of them so broad as to nearly stretch across the inner face of the tarsus. The inner toe is short, the tip of its small weak claw hardly reaching to the base of the middle claw. The outer toe without its claw is decidedly longer than the middle one; but the much greater size of the claw of the latter makes up the difference. The hallux is large and stout; a straight, almost perfectly conical, moderately acute, claw.

This genus is trenchantly separated from all others by the characters of the bill; in the lateral dilatation of which, the widely divaricating rami of the under mandible, and the partially naked and distensible skin of the interramal space, there is seen an approach to *Prion* of the *Procellariinæ*, and also to *Pelecanoides* of the *Halodrominæ*. The superior lateral mandibular laminæ are so wide and large, and so inflated, that they give a bulging convex lateral outline to the bill. In the same manner the inferior mandibular rami rapidly diverge from each other, their concavities presenting to the interramal space. In all these points there is an interesting resemblance to the genus *Pelecanoides;* further heightened by the broad ample rictus, loose dilatable skin of the floor of the mouth, which is only partially feathered. These peculiarities are not shared by any other genus of *Procellariinæ* except *Prion;* and leaving out of consideration the widely diverse nostrils, the bills of *Pelecanoides urinatrix* and *Daption capensis* are very similar in shape.

The genus is of moderate size, of robust and compact form, and variegated in the distribution of its colors. Its only known species is the type upon which it is based, the well known *D. capensis*.

DAPTION CAPENSIS (L.) Steph.

Procellaria capensis, Linn., S. N. 10th ed. 1758, p. 132. Linn. S. N. 12th ed. 1766, i. p. 213, No. 5. Linn. Amoen. Acad. iv. p. 240, and of other authors.
Daption capensis, Stephens, Shaw's Zool. 1825, xiii. p. 241: and of later authors.
Procellaria nævea, Brisson, Ornith. 1760, vi. p. 146, No. 3.
Procellaria punctata, Ellman, Zool. 1861, p. 7473. Cape Pigeon; Black and White Petrel; Petrel Tacheté; Pintado; Damier; Pardela, etc., Voyager's Vulgo.

This is one of the three species of *Procellaria* given by Linnæus in 1758. It has remarkably few synonyms, in consequence of its marked characteristics. Its features are so well known that no mention of them is necessary in this connection, as the peculiarities of its bill have been elucidated under the head of the genus.

Section *PRIONEÆ*.

The presence of laminated serrations along the inner edge of the upper mandible so trenchantly defines this group, that further characterization is unnecessary. A great similarity of color is found to prevail throughout.

After elimination of the genus *Halobæna* on the ground of its square tail and some other peculiarities, I find among the so-called Prions two very dissimilar types; which I consider as of generic import, and am therefore compelled, however reluctantly, to separate under a new designation.

The three genera here recognized may be thus distinguished:—

A. Bill compressed, its unguis large, its serrations moderate in extent, or confined to the base of the upper mandible.
   I. Tail truncated ..... *Halobæna.*
   II. Tail graduated ..... *Pseudoprion.*
B. Bill excessively dilated, depressed, its unguis small and weak; the serrations large and perfect to the extremity of the bill.
   III. Tail graduated ..... *Prion.*

HALOBÆNA Is. Geoffr.

Procellaria sp. Gmelin, et auct.
Prion sp. Gray, Reichenbach, fide Bp.

Halobæna, "Is. Geoffr. 1836," Bon. C. A. 1855, ii. p. 193. (? Type *P. cærulea*, Gm.)

Chs. Bill provided with a few laminated serrations at the sides of the base of the upper mandible, just within the commissural edge of the upper mandible; in length slightly less than the tarsus, equal to the inner toe without its claw; slender, compressed throughout, a little higher than wide at the base. Superior lateral sulcus well marked, nearly straight; inferior shallow and indistinct. Unguis of upper mandible small, short, only moderately convex. Inferior unguis acute, much decurved, the gonys very concave, the ramal outline straight. Interramal space fully feathered. Nasal tubes only a fifth the length of the culmen, short, narrow, elevated, compressed, not carinated, terminally obliquely truncated; nares narrowly oval. Folded wings reach far beyond tail. Tail contained rather more than $2\frac{1}{2}$ times in the wings from the carpal joint; square, with no graduation of the lateral feathers; all the rectrices so broadly rounded as to be nearly truncated. Tarsus equal to middle toe without claw; outer rather longer than the middle; but its claw so short as to make its total length rather less than that of the middle. Tip of inner claw just reaching base of middle.

The principal character which distinguishes this genus lies in the short, square tail; a feature which is quite unique in this family, being found in no other genus of the *Procellariidæ*. Its type and only known species is the old *cærulea* of Gmelin, a small delicately formed species, whose colors tend chiefly to bluish and white.

In general features of external form, proportions of tarsus and toes, and particularly the shape of the bill, which is much compressed, this genus is quite similar to *Æstrelata*, especially to such of its smaller species as *mollis* and *Cookii*. Nevertheless, the presence towards the base of the bill of distinct serrated laminæ, which constitute the essence of the *Prionitic* type,* indubitably fix its position among the latter group, to which also it so closely approximates in color. These laminæ only exist for a short distance on either side of the base of the bill; but still they are quite palpable and decided in character; perhaps as much so as in *Pseudoprion turtur* or *ariel*. The small and rather weak unguis, which does not begin to curve almost directly from the unguis, is essentially Prionitic, as distinguished from typical *Æstrelatines*. The bill though higher than broad in its whole length, is hardly more compressed than in *P. turtur*. From these considerations, and esteeming, as I believe justly, that the laminations are the essential character of the *Prioneæ*, and consequently more weighty than all others, I include the somewhat anomalous genus in this latter group. I regard it as the connecting link between the *Æstrelateæ*, on the one hand, through the genus Daption, and the *Prioneæ* on the other, towards the true type of which latter it approximates through the subtypical genus *Pseudoprion*.

I quote the reference to Isidore Geoffroy on the authority of Bonaparte, not having the means at hand of verifying the citation. I do not know what species is typical in the original founding of the genus. If it be the one named *Halobæna typica* in the Conspectus, then *Halobæna* is equivalent to, and has priority over my *Pseudoprion;* and a generic name is wanting for the *P. cærulea* of Gmelin.

HALOBÆNA CŒRULEA (Gm.) Bon.

Procellaria cærulea, Gmelin, S. N. i. ii. 1788, p. 560. Latham. Ind. Orn. 1790, ii. p. 827. Gould, Birds Aust. pl. 52, and of authors generally.
Halobæna cærulea, Bonaparte, C. A. 1855, ii. p. 193.

* In some genera not of the *Prioneæ*, e. g. *Daption*, *Ossifraga*, etc., there are to be found along the inner border of the cutting edge of the upper mandible, a series of rugæ or alternate depressions and ridges, obliquely placed. These, however, are part of the mandible itself, and by no means distinct elements, and therefore are radically different in morphological character from the laminæ of the *Prioneæ*.

Pachyptila cærulea, Illiger, Prod. 1811, p. 275.—Steph. Shaw's Gen. Zool. 1825, xiii. p. 252.

Procellaria similis, "Forster's Drawings, No. 86." Forster, Descr. Anim. ed. Licht. 1844, p. 59.

Procellaria Forsteri, Smith, Ill. S. Afric. Birds, pl. 54. But not of Latham, which is *Prion vittatus*.

Habitat.—Antarctic Ocean. Australia.

Color. There is a short and not very conspicuous infra-ocular white line, and a superciliary streak of the same color; but not, however, running far down on the auriculars behind the eye. Above the bird is of a clear cinereous or grayish blue; extending as delicate clouding around the sides of the breast; and deepening on the head, most of the wing-coverts, the outer edges and tips of the four outer primaries, into brownish ash. It is chiefly the lesser wing coverts that are thus darkened; most of the greater ones being nearly as clear as the back. The secondaries and tertials are clear cinereous, edged and tipped with white; their inner webs being almost wholly of this color. The inner vanes of all the primaries, but particularly of the first four, are almost wholly pearly white except at their tips. The upper tail coverts are concolor with the back. The exterior pair of rectrices are white, with dark brown shafts; the next two are colored like the back; the rest similar except that a fuscous hue deadens the cinereous towards the end of the feathers, and their tips are squarely, trenchantly, and purely white; each for an increasing distance from without inwards. Forehead, cheeks, lower auriculars, under surface of wings and whole under parts of the body pure white.

Younger birds may be known by a less decidedly cinereous or bluish gray tinge of the upper parts; which tend more or less strongly towards brownish. The forehead is not pure white but mixed with about an equal amount of brownish ash. I have never seen specimens entirely fuscous or brownish cinereous below; but think it probable that such a state of plumage characterizes very young birds.

Dimensions. Chord of culmen 1·12; height of bill at base ·45; width slightly less. Tarsus 1·25; middle toe and claw 1·60; outer do. 1·50; inner do. 1·37. Tail 3·50; wing 8 to 9.

There is no other known Petrel with a square tail, conspicuously tipped with white. This peculiarity is mentioned in the various descriptions of the authors cited above in the list of synonyma, so that there is no difficulty in identifying their names. The *similis* of Forster* is said to have "rectrices 12 omnes apice candido-fasciatæ" which positively determines the species, although that author is in error in saying that it has the bill "non pectinatum."

PSEUDOPRION Cones.

Chs Lateral lamellæ of upper mandible normally developed, their surfaces vertical. Lateral outline of bill straight. Dorsal outline concave to the unguis. Unguis comparatively large, its chord forming more than a third of the total length of the culmen. Commissural edge of upper mandible not dilated. Inferior mandibular rami straight, divaricating at an acute angle; the lateral sulcus apparent. No groove for reception of fringe from upper mandible, which is either quite obsolete or imperfectly developed towards the end of the bill. Interramal space narrow, triangular, well feathered. Extension of feathers on side of lower mandible not further than those on culmen. Tail moderately graduated.

Type. *Prion turtur* Gould.

In amplification of the differences between the so-called *Prion Banksii, tur-*

* Concerning which Prof. Lichtenstein says very erroneously, "Species obscura, ulteriori examini relinquenda. A *Pr. vittata* (*Pachyptila*) non esse diversam nisi ætate suspicor."

tur, *ariel* and *? brevirostris*, and *Prion* proper, the following comparison is instituted.

The fringe of laminæ is smaller and weaker, and inflected inwards rather than descending vertically; and it is either restricted to a short space near the base of the bill (*turtur*, *ariel*, *? brevirostris*) being quite obsolete more anteriorly; or if as in *Banksii* it extends to the unguis, it is small, weak and inconspicuous. The lateral lamellæ of the bill have scarcely more of development and inflation than in other genera of *Procellariinæ*, instead of being immensely hypertrophied; and they have a lateral, vertical aspect, instead of a superior nearly horizontal one. The commissural edge of the upper mandible looks downwards, with little inflation or reflection outwards, and nearly (though not quite except apically) touches the under mandible. There is no groove for the reception of the fringe of the upper mandible; but in its place the ordinary lateral sulcus of the sides of the lower mandible is apparent, though not very strongly marked. The inferior mandibular rami divaricate at an acute angle, and are quite straight, instead of widely diverging with a mutual concavity. The submental space, narrow and triangular instead of broadly conoidal, is quite fully feathered, instead of nearly naked; and doubtless has little of the distensibility which characterizes that of *Prion*. The extent of the feathers on the lower mandible is much more restricted. The unguis of the bill is larger, stronger, more convex, its tip more decurved, the chord of its convexity forming more instead of less than a third of the length of the culmen. The lateral outline of the bill is straight not convex. The tail is shorter than in Prion, being contained nearly twice in the wing; and it is less cuneiform, The nostrils and the proportions of the feet, are as in Prion; while the entire similarity, almost identity, of the coloration has doubtless had much to do with the referring of the species of this genus to Prion.

In the following antithetical table the main diagnostic points of the two genera are contrasted.

Pseudoprion.	*Differential Elements.*	Prion.
a. Poorly developed, or entirely obsolete towards end of bill.	a. *Fringe of serrations.*	*a.* Extensively and completely developed throughout.
b. Normal; vertical; not vaulted; nor with inflated free edge.	b. *Lateral lamellæ of bill.*	*b.* Hypertrophied; horizontal; arched; with inflated free edge.
c. Concave.	c. *Dorsal outline of culmen.*	*c.* Straight.
d. Of ordinary size, its chord more than a third of culmen.	d. *Unguis.*	*d.* Very small; its chord less than a third of culmen.
e. Straight.	e. *Lateral outline of bill.*	*e.* Convex.
f. Absent.	f. *Groove for reception of fringe.*	*f.* Present.
g. Apparent.	g. *Lateral groove on lower mandible.*	*g.* Wanting.
h. Nearly straight.	h. *Cutting edges of lower mandible.*	*h.* Very sinuate.
i. Narrowly triangular, well feathered.	i. *Interramal or submental space.*	*i.* Broadly conoidal, nearly naked.
k. Extend no further than those on culmen.	k. *Feathers on lower mandible.*	*k.* Extend much beyond those on culmen.
l. Moderately graduated, central feathers not protruding; contained nearly twice in the wing.	l. *Tail.*	*l.* Much graduated, central feathers elongated, contained one and a half times in the wing.

PSEUDOPRION BANKSII (Smith) Coues.

Pachyptila Banksii, A. Smith, Ill. S. Afric. Bds. pl. 55.
Prion Banksii, Gould, Ann. Mag. N. H. 1844, xiii. p. 366. Gray, Gen. Birds, iii. 1849, p. 649. Bonaparte, C. A. 1855, ii. p. 193.
Procellaria Banksii, Schlegel, Mon. Proc. Mus. Pays-Bas, 1863, p. 17.

Habitat.—Antarctic regions, coming northward into temperate latitudes of both Hemispheres.

This species may be readily recognized by the continuation to the unguis of the fringe of laminæ, whereas in the others of the genus it is confined to a short space near the base of the bill. The laminations are, however, very small anteriorly; and are somewhat deflected inwards.

In colors the species of both *Pseudoprion* and *Prion* are so nearly identical that, compared with *Prion vittatus*, the present species seems to differ in hardly aught else than in the less amount of blackish towards the tail. On the middle feathers it is about an inch in depth; laterally decreasing so rapidly that there is hardly a trace of it on the three outermost. The bill and feet, however, are differently colored.

Dimensions. Bill (chord of culmen) a little more than one inch; width at widest point 0·50, height at base 0·44, at unguis about the same. Nasal tubes ·18. Tarsus 1·25. Middle toe and claw 1·50, outer do. about the same; inner do. 1·25. Wing 7·50 to 8·00. Tail 4·00; its graduation about ·75.

PSEUDOPRION TURTUR (Banks) Coues.

Procellaria turtur, "Banks icon. 15," and Solander's MSS. fide Bp. ? Kuhl, Mon. *Proc.* Beit. Zool. 1820, p. 143, No. 14, pl. xi. fig. 8. A. Smith, Ill. Zool. S. Afric. Bds. pl. 54. Gray, Genera Birds, 1849, iii. p. 648. Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 17.
Prion turtur, Gould, Ann. Mag. N. H. xiii. 1844, p. 366. Introd. B. Aust. p. 117, No. 602.—Id. B. Aust. vii. pl. 54. Bonaparte, C. A. 1856. ii. p. 193.

Habitat.—"Whole Pacific Ocean, between 30° and 50° of south latitude." (Gould.)

A species absolutely identical with *P. Banksii* in colors of plumage; but readily to be distinguished from that species by its somewhat smaller size, decidedly slenderer and more compressed bill, and especially by the restriction of the fringe of laminæ to the base of the bill, and their very incomplete development. The bill and feet are described as similarly colored with those of *Prion vittatus;* the webs flesh colored. The following measurements, particularly of the bill, taken from a specimen in the Philadelphia Academy, are to be compared with those of *Banksii* above given.

Chord of culmen 1·00; width of bill at base 0·33; height at base 0·37; at unguis the same. Nasal tubes 0·18; tarsus 1·15; middle toe and claw 1·45; outer do. 1·50; inner do. 1·25. Wing 7·25; tail 3·50; its graduation 0·50.

Authors agree in identifying the *Pr. turtur* of Banks' and Solander's inedita with the species beautifully figured by Mr. Gould under this name, and distinguished from *Banksii* by the characters given in the preceding paragraphs.

Following the *P. turtur* in Bonaparte's Conspectus is given a "*Pr. Rossi*, Gr. Mus. Britann. ex Mar. antarcticis. Similis *Prioni turturi;* sed minor, et proportionibus diversis; rostro latiore." I do not know what this can be; unless, as is quite probable, it indicates the *Prion ariel*, Gould.

PSEUDOPRION ARIEL (Gould) Coues.

? Procellaria turtur, Kuhl, Mon. *Proc.* Beit. Zool. 1820, p. 143, pl. xi. fig. 8. (Also of Lesson, according to Bonaparte.)
? Procellaria velox, Banks, ic. ined. No. 16, fide Bp.
Prion ariel, Gould, "Proc. Zool. Soc." Ann. Mag. N. H. 1844, xiii. p. 366.—Introd. B. Aust. p. 117, sp. 605.

Procellaria ariel, Schlegel, Mon. Proc. Mus. Pays-Bas, 1863, p. 18.
Halobæna typica, Bp. C. A. 1856, ii. p. 194.

Habitat.—Australian Seas.

I have not been able to find where this species is originally described by Mr. Gould, if it has been at all more than named by him. From Dr. Schlegel's description* of typical specimens received by him from Mr. Gould, it appears to have exactly the colors, and the development of the laminæ of the bill which obtain in *P. turtur*; and to be distinguished from that species by its smaller size; and a very slender bill, wider than high at the base.

Synonymy. It is a little uncertain to which species the *P. turtur* of Kuhl's Monograph, No. 14, fig. 8, really refers. The figure of the bill agrees quite nearly with a specimen of the *turtur* Gould, of the preceding article of this paper; but the description given by Dr. Kuhl, and especially the measurements rather seem to indicate the present species, *ariel*, Gould. But Dr. Kuhl also gives the measurements "Avis aliquantum major," which rather are those of the true *turtur*. There are cited Bank's *turtur*, pl. 15, and also *Pr. velox* Banks, pl. 16, as synonyma; the first of which (according to most authors) representing the *turtur* of Mr. Gould, and of this paper; the second indicating the true *ariel* of Gould. Under the circumstances, it is evident that Kuhl's *turtur* may be, without violence, referred to either of the two species; and authors are about equally divided in opinion regarding it.

Bonaparte's Conspectus does not admit *ariel* as a valid species; but has instead a certain *Halobæna typica* Bp. based upon a specimen in the Paris Museum. He cites "*turtur*" Lesson, Kuhl, fig. 8, and "*velox?*" Banks, pl. 16, as synonyms; and his diagnosis presents no points forbidding the reference of this *H. typica* to the *Prion ariel* of Gould, with which Dr. Schlegel considers it as synonymous.

? Pseudoprion brevirostris (Gould).

Prion brevirostris, Gould, P. Z. S., 1855, p. 88, pl. 93.

"Upper surface delicate blue; edge of the shoulder, the scapularies, outer margins of the external primaries, and tips of the middle tail feathers black; lores, sides of the head and all the under surface white, stained with blue on the flanks and under tail coverts; bill light blue, deepening into black on the sides of the mandible and at the tip, and with a black line along the side of the under mandible; feet light blue; interdigital membranes flesh color.

Length 10½ inches; bill $\frac{15}{16}$; wing 6⅝; tail 3½; tarsi 1¼."

I am only acquainted with this supposed species by the plate and description of Mr. Gould, above cited, and can offer no opinion regarding it. The description does not indicate any tangible points of difference from *P. ariel*. By Gray, and, I believe, also by the majority of writers, it is considered as a synonym of *P. ariel*.

PRION Lacépède.

Procellaria sp. Auct.
Prion, Lacépède, Mem. de l'Inst., 1800—1801, p. 514. (Gray).
Pachyptila, Illiger, Prod., 1811, p. 274, No. 132.
Priamphus, Rafinesque, 1815, fide Bp.

The essential characters of this genus lie in the peculiar shape of the bill and the complete development of the serrated laminæ, which are the distinguishing features of the group of which it is typical. The modifications to which the bill is subjected produce a result which, compared with other *Procellaridæ*, may be likened to that seen in the genus *Cancroma* among the

*Schlegel l. c. "Semblable à la *Procellaria turtur*, également par rapport aux lamelles des mandibules; mais de taille moins forte, et à bec plus faible. Aile 6 pouces 2 lignes; pointe de l'aile 2 pouce 3 lignes. Queue; pennes mitoyennes 2 pouces et 8 à 10 lignes; pennes externes 2 pouces et 5 à 7 lignes. Bec: longueur 9 à 10 lignes; hauteur 2 lignes et demie; largeur 3 lignes et demie a 4 lignes. Tube nasal, 2 lignes. Tarse 12 a 13 lignes. Doigt du mileau 12 a 13 lignes. Individus de Mers de l'Australie obtenus en 1863 de Mr. Gould."

Ardeidæ. I have not met with as detailed a description of its peculiarities as seems desirable.

The culmen, from the extremity of the nasal case to the root of the unguis, is quite straight. Though rising up as a conspicuous ridge between the deep longitudinal sulci on either side, its outline is broad, flat, depressed, and not carinated. The unguis of the upper mandible is small and weak, and hardly rises above the level of the culmen proper; its convexity and decurvation are slight.

On either side of the culmen, from the root of the nasal case to the junction of the lateral mandibular lamellæ with the unguis, lies a well-marked, deep longitudinal sulcus; the central line of which depression, from the end of the nostrils to the unguis, is occupied by a distinctly defined ridge.

The immensely-developed lateral lamellæ of the superior mandible have so great a lateral extension, as to make the width of the bill at its broadest part nearly two-thirds its length. These lamellæ are arched and inflated throughout; and their surface is superior, not lateral. The free commissural edge is convex in outline; retreating slightly inwards and backwards from the broadest point of the bill, which is a little in advance of its extreme base; converging more rapidly and nearly in a straight line thence to the unguis; it is dilated and bulging posteriorly where it overhangs, but by no means meets or touches, the inferior mandibular rami; more anteriorly, it is deflected downwards, and terminally rests against the unguis of the lower mandible.

From the under surface of the lateral lamella near its free edge grow a series of serrated laminæ, which extend from the very angle of the mouth to the unguis; their outline corresponding nearly to that of the edge of the lamella whence they spring. They are directed downwards, with a little outward and forward inclination. They are longest, largest, and their "set" is most oblique at the broadest point of the bill; whence, as they proceed either forwards or backwards, they diminish in size and become more vertical in direction. It is this fringe of serrations that is in apposition with the under jaw; forming, therefore, the true commissural edge of the upper mandible. These laminæ are, so to speak, a series of plates, antero-posteriorly thin, elastic and yielding; transversely wide and resisting; whence it results that they can readily be bent away from each other; but the series cannot be laterally deflected, as a whole; exactly as is the case with the teeth of a comb.

The nasal tubes are very short, measuring hardly more than a fifth the length of the culmen and unguis; broad and depressed; placed conspicuously high upon the base of the culmen. They are somewhat more elevated apically than basally; their apex is so deeply emarginate as to cause a partial segregation of the two tubes towards their termination. The orifice of each naris is circular; the internasal septum rather wide.

Corresponding with the general shape of the upper, the lower mandible is very broad; its rami widely divaricating, presenting much concavity towards each other. Its cutting edge is very sharp and strongly sinuate for its whole length, being curved in several planes oblique to each other. From the widest point, which is opposite the extremity of the feathers on its side, the rami rapidly converge to the unguis; which latter is very small and weak, its gonys very concave in outline, its tip acute and much decurved. There is hardly an eminentia symphysis.

The true lateral sulcus of the rami, seen in most *Procellariinæ*, is wanting. In its place we have, just external to the true cutting edge of the lower mandible, a groove which extends the whole length of the ramus; deepest and most marked posteriorly; apically becoming obsolete. This groove, owing to the inflection of the edge of the mandibular ramus, looks upwards and outwards, and into it the fringe of laminæ are received. More anteriorly where the groove is obsolete, the teeth simply abut against the side of the under mandible.

[May,

The broad space between the widely-separated, mutually concave inferior mandibular rami is occupied by soft, more or less distensible skin, naked of feathers, except a small triangular wedge which extends forwards from the base only to a point but a little in advance of the termination of the feathers on the side of the lower mandible. Even this patch does not fill the space from side to side. The feathers on the side of the lower mandible extend as far as the broadest point of the bill. The frontal feathers project a little on the nasal case. Retreating somewhat, they then stretch transversely across the base of the lateral lamellæ, with no obliquity backwards, to the very edge of the bill; which is thence densely feathered to the angula oris.

Bill about as long as the tarsus; the latter equal to middle toe without its claw; covered with quite regular hexagonal plates, largest antero-interiorly. Outer toe and claw about equal to middle. Tip of inner reaching base of middle. Hallux strong, straight, conical, placed rather low down. Folded wings not surpassing tail. First and second primaries about equal; last successively more rapidly graduated. Tail long; two-thirds the wing from the carpus, or contained one and a half times in it; cuneate; central rectrices acuminately rounded and somewhat projecting; lateral ones more broadly rounded and much graduated in length.

PRION VITTATUS (Gm.) Lacép.

Procellaria vittata, Gmelin, S. N. i. pars ii. 1788, p. 560, and of authors.
Prion vittatus, Lacépède, Gray, Gen. Birds, 1849, iii. p. 649, and of later authors.
Pachyptila vittata, Illiger, Prod., 1811, p. 275.
Procellaria Forsteri, Latham, Ind. Orn. ii. 1790, p. 827. Not of Smith.
Pachyptila Forsteri, Swainson, Class. Birds, ii. p. 374. Lesson, Traité, 1831, p. 613. Jard. and Selb. Illust. Orn. pl. 47. Steph. Gen. Zool. xiii. 1825, p. 251.
Procellaria latirostris, Bonnærté, Ency. Metod.

Habitat.—Southern portions of both Atlantic and Pacific.

Line over the eye white. A transocular dusky fascia. Entire upper parts light grayish or plumbeous blue; which color, somewhat diluted, clouds the sides of the breast and the flanks. Edge of wing, lesser coverts, outer vanes and tips of four first primaries, and terminal area on tertials, blackish plumbeous. Inner vanes of quill feathers and tips of tertials fading into pearly or grayish white. Tail concolor with back; passing terminally into plumbeous black; which, from an extent of 1½ inches on the central rectrices, decreases successively to a bare trace on the outer ones. Under tail coverts white, somewhat clouded with plumbeous. All other parts are pure white. "Bill light blue, deepening into black on the sides of the nostrils and at the tip, and with a black line along the sides of the under mandible; irides very dark brown; feet beautiful light blue." [Gould.]

Dr. Kuhl's fig. 13, and M. Temminck's Pl. Col. 528, are by Dr. Schlegel supposed to refer to the *P. Banksii* rather than to this species, contrary to the opinion entertained by most ornithologists. The former figure measures eleven-sixteenths of an inch in width at the widest part of the bill; a dimension which the *Banksii* is hardly known to attain.

In accordance with the views entertained in the preceding pages, the following synopsis of the genera and species of the two sections treated of is prepared.

Family *PROCELLARIIDÆ.*

Subfamily PROCELLARIINÆ.

Section *Æstrelateæ* (Bp. 1855).

The cutting edge of the upper mandible is not dilated nor furnished with serrations.

Genus I. ÆSTRELATA Bp., 1855. Bill robust, compressed, its unguis large, hooked from the nostrils. Interramal space narrow, fully feathered. Extension of feathers on forehead moderate. Nasal case short. Tail more or less cuneiform, the lateral rectrices much graduated. Hallux of ordinary size.

1. A. HÆSITATA Coues, ex *Proc. hæsitata* Kuhl. Not of Forst., Reich., Gld. nor *Puff. hæsit.* Lawr. *Proc. brevirostris* and *meridionalis* Lawr., or *Fulmarus merid.* Bp., but not *brevirostris* Less. *Puffinus l'Herminieri* Less. *Æstrelata diabolica* Bp. Large; pileum and upper parts brown; upper tail coverts, basal half of tail, forehead and neck all around white. Bill or tarsus 1·45; wing 12·00; tail 5·50; middle toe and claw 2·12.

2. A. LESSONI Cassin, ex *Proc. Lessoni* Garnot. *Rhantistes Lessoni* Bp. *Proc. leucocephala* Forst. *Æstrelata leuco.* Bp. *?Pr. alba* Gm. *?Daption album* Steph. *Pr. variegata* Bonn. *Pr. vagabunda* Sol. secundum Bp. Large; head all around white, except a transocular fascia. Back deep ash. Tail and coverts ashy gray. Bill 1·50; tarsus 1·65; middle toe and claw 2·50.

3. A. ROSTRATA Gray, ex *Pr. rostrata* Peale. *Rhantistes rost.* Bp. Large, bill exceedingly robust, along chord of culmen 1·37; height or width at base 0·66. Wing 11·00, tail 4·75. Tarsus 1·75. With the pattern of coloration and nearly the tints of young *Lessoni.* Frontal feathers running far forward on the nasal case.

4. A. PARVIROSTRIS Coues, ex *Pr. parvirostris* Peale. *Rhantistes parvir.* Bp. Medium, bill slender and compressed, its length 1·08. Tarsus 1·25. Outer toe and claw 1·66. Young? Above deep fuliginous brown, (no trace of ashy,) this color extending all around the head and neck, on the tips of the feathers.

5. A. INCERTA Coues, ex *Pr. incerta* Schlegel.—Large. Wing 11·50; tail nearly 5, much graduated. Bill 16 to 17 lines; height 5 lines. Tarsus 1·50. Colors as described much those of young *Lessoni;* to which the species may be referrible.

6. A. NEGLECTA Coues, ex *Pr. neglecta* Schlegel.—Medium, with the colors of *incerta.* Bill; length 1·12; height 4 to 5 lines. Wing 10·00 inches. Perhaps to be referred to *parvirostris.*

7. A. SOLANDRI Coues, ex *Proc. solandri* Gould.—*Cookilaria solandri* Bp.—*Pr. melanopus* Natt. nec. Gm.—Large; very robust. Length 16; bill 1·75; wing 12; tarsus ·75; tail 5·50; middle toe and claw 2·37. Bill and feet black. Above dark brown; becoming slate gray on middle of back, and wing and tail coverts. Young? Washed with gray on the abdomen.

8. A. GRISEA Coues, ex *Pr. grisea* Kuhl, according to Schlegel's identification.—*Pr. lugens* Banks, Forst. ined. *Æst. inexpectata* Bp. nec. Forst. Medium, generally like *mollis;* with a more compressed bill, and some discrepancies in dimensions. Wing 9·50; tail 3·88; bill 11½ lines; tarsus 16½ lines; middle toe 19 lines.

9. A. MOLLIS Coues, ex *Pr. mollis* Gould.—*Cookilaria* and *Rhantistes mollis* Bp.—*Pr. inexpectata* Forst.—*? Pr. melanopus* Gm. Vieill. Steph.—*? Pr. gularis* Peale.—*? Pr. Philippii* Gray.—*? Pr. crepidata* vel *sandaliata* Sol. according to Bp. Medium, bill (chord of culmen) 1·10; height at base ·45; width slightly less; tarsus 1 33; outer toe and claw 1·75; wing ranging from 9·50 to 10·50; tail 4·50. Under surfaces of the wings concolor with the upper.

10. A. COOKII Coues, ex *Pr. Cookii* Gray.—*Rhantistes Cookii* Bp.—*Pr. leucoptera* Gld. *Cookilaria leucoptera* and *C. velox, Rhantistes velox* Bp. *Pr. brevipes* Peale. Small. Bill 1·00, height at base ·35. Wing 8·50 to 9·00; tail 3·75 to 4·25, its lateral graduation 1·00 to 1·50. Tarsus 1·10. Under wing coverts and a line along edge of fore arm white.

[May,

11. A. GAVIA Coues, ex *Pr. gavia* Forst. (following G. R. Gray's authority.) Small; with the colors generally those of *Cookii*, including under wing coverts. "Expanse 26; bill 1·50; tibiæ 1·75; tail 2·50," [Forst.]

12. A. DESOLATA Bp. ex *Pr. desolata* Gm.—*Daption desolatum* Steph. Smallest. With the general colors of *Cookii*. Wing 7·80; tail 3·40, its graduation ·75. Bill less than one inch. Tarsus or middle toe about 1·00.

13. A. MACROPTERA Coues, ex *Pr. macroptera* Smith.—*Ossifraga macroptera* Reich.—*Pterodroma mac.* Bp.—*Pr. brevirostris* Less. nec. Lawr.—*? Pr. lugubris* Tsch. Large; wings long; face gray; tarsi yellow.

14. A. FULIGINOSA Coues, ex *Pr. fuliginosa* Kuhl, sp. 12, (not *fulig.* Kuhl, sp. 27; not of Gm. Lath.; not *Puff. fulig.* Strickl. not *Nectris fulig.* Forst.)—*Pr. atlantica* Gld. *Pterodroma atl.* Bp. Large. Everywhere fuliginous; feet dark colored. Bill 1·35. Tarsus 1·60; middle toe and claw 2·20; wing 10·75 to 11·50; tail 4·50 to 5·00.

15. A. ATERRIMA Coues, ex *Proc. aterrima* Verr.—*Pterodroma aterr.* Bp. Small. Tarsi light colored, passing into black upon the terminal portion of the toes. Wing 8·50; tail 3·50; bill slightly more than an inch. Tarsus 1·33.

16. A. BULWERI Coues, ex *Pr. Bulweri* Jard. and Selby. *Thalassid. Bulweri* Gray.—*Pr. anjinho* Heineken.—*Puffinus columbinus* Webb and Berth.—*Bulweria columbina* Bp. Smallest. Proportionate length of tail to wing as 4·50 to 8; graduation of tail 1·75 to 2·00. Bill ·85; tarsus a little longer.

17. A. MACGILLIVRAYI Coues, ex *Thalassidroma* (*Bulweria*) *macgillivrayi* G. R. Gray. Like *Bulweri;* bill larger; no sooty brown on wings.

18. A. CARRIBÆI Coues, ex *Pterodroma carribæi* Carte. "Blue Mountain Duck," Gosse.

Genus II. PAGODROMA Bp. 1855. Bill very short, moderately strong and compressed. Forehead flattened; and lengthened by the extension forward of the feathers. Interramal space narrow, densely feathered. Nasal tubes short. Hallux unusually developed. Tail long, broad, but slightly rounded.

19. P. NIVEA Bp. ex *Pr. nivea* Gm.—*Daption n.* Steph. *Thalassoica n.* Reich.—*Proc. candida* Peale. *Pagodroma* var. *major* Bp. Entirely white. Subject to great variations in size; forming var. *minor* Bp.

Genus III. DAPTION Steph. 1825.—Bill much dilated, unguis small and weak. Interramal space wide and partially naked, oblique sulci on inner face of cutting edge of mandible. Fasal tubes long. Hallux of ordinary size. Tail rather short, moderately rounded.

20. D. CAPENSIS Steph. ex *Pr. capensis* Linn.—*Pr. nævia* Briss.—*Pr. punctata* Ellm. Spotted with black and white on upper parts.

Section *PRIONEÆ* (Bp. 1855.)

The upper mandible is furnished near its edge with laminated serrations.

Genus I. HALOBÆNA Is. Geoff. External form of bill much that of *Æstrelata;* serrations few and inconspicuous. Tail truncated.

1. H. CŒRULEA Bp. ex *Pr. cœrulea* Gm. *Pachyptila cœrulea* Ill. Steph. *Pr. similis* Forst. *Pr. Forsteri* Smith, nec. Lath. Tail tipped with white.

Genus II. PSEUDOPRION Coues. Serrations poorly developed or quite obsolete towards end of bill. Lateral lamellæ of bill normal, their free edges uninflated. Culmen concave; lateral outline of bill straight. Interramal space narrow, well feathered. No sulcus for reception of fringe. Tail moderately long and rounded, contained nearly twice in the wing.

2. Ps. Banksii Coues, ex *Pachyptila Banksii* Smith.—*Prion B.* Gld. *Procellaria B.* Schl. The fringe of serrations is apparent to the end of the bill. Chord of culmen 1·05; width of bill at widest point ·50; height at base ·44.

3. Ps. turtur Coues, ex *Proc. turtur* Banks "icon. ined. No. 15."—Also of Kuhl? *Prion turtur* Gld. The fringe of serrations is confined to the basal portion of the bill. Chord of culmen 1·00; height of bill at base ·37; width ·33.

4. Ps. ariel Coues, ex *Prion ariel* Gould.—*? Proc. turtur* Kuhl.—*Proc. ariel* Schl. *Halobæna typica* Bp.—*? Prion brevirostris* Gld. Smaller than *turtur*. Bill 9 to 10 lines, height 2½ lines; width 3½ to 4 lines.

Genus III. Prion Lacép. 1800—1. Serrations developed to the maximum. Lateral lamellæ hypertrophied, with inflated free edges. Culmen straight; lateral outline of bill convex to the unguis. A deep sulcus on either side of the culmen; another on the lower mandible for reception of the fringe. Interramal space broad, nearly naked. Tail elongated, much graduated, contained 1½ times in the wing.

5. Pr. vittatus Lacép. ex *Proc. vittata* Gm. *Pachyptila vitt.* Ill. *Proc. Forsteri* Lath. nec. Smith. *Pachypt. Forsteri* Swains. *Proc. latirostris* Bonn. Greatest width of bill three-fourths of an inch or more.

In a subsequent paper will be considered the *Diomedeinæ* and *Halodrominæ*.

Critical Review of the Family PROCELLARIIDÆ;—Part V; embracing the DIOMEDEINÆ and the HALODROMINÆ. With a General Supplement.

BY ELLIOTT COUES, M. D., U. S. A.

The group composed of the Albatrosses is so trenchantly distinguished from all other *Natatores*, that for its definite characterization it is only necessary to advert to the absence of the hallux, and to the position of the rhinothecæ. In other morphological points the Albatrosses conform closely to the type of structure which obtains throughout the *Procellariinæ*.

The Halodromes, if really components of the family *Procellariidæ*, are the most curiously aberrant of all the *Gaviæ* or Longipennine Natatores. They appear to hold a quite anomalous position, intermediate between several natatorial suborders. The very short falcate wings, no less than the absence of the hallux; the general configuration of the body, and especially the position of the posterior extremities relative to the axis of the body; as well as the compactly imbricated, glossy plumage; indicate a close affinity with the *Urinatores*, or Brachypterous Natatores. These structural resemblances are borne out by the attitudes, habits, and mode of life of the species, so far as we are acquainted with them; which are rather those of Guillemots than of Petrels. The dilation of the bill, particularly of the under mandible, and the partially naked and distensible submental skin, which forms an imperfect pouch, point to a type of structure extensively prevailing among the *Totipalmi*. Most of the latter have the rhynchotheca segmented; so that almost the only character of the Halodromes which is strictly Procellaridian is the tubulation of the rhinotheca; and even in this feature the details of shape and direction of axis are entirely unique. So far indeed as external characters are concerned, arguments are adducible for their reference to either of the three tribes above alluded to; and especially to the *Urinatores*. It remains for the scalpel to finally determine their true affinities.

By Illiger* the tubulation of the rhinotheca has been made indicative of a tribe (although called a family) *Tubinares*, which is attaching to it a value coördinate with such a character as *e. g.* the membranous union of the hallux

* Prodromus, 1811, p. 274.

with the inner anterior digit, which defines what we now recognize as the tribe or rather suborder *Totipalmi*, embracing numerous families. Proceeding upon this basis we should be obliged in like manner to form a tribe or suborder "Linearinares" of what is now known as the family *Laridæ*, and erect its four recognized subfamilies into as many families.

By Bonaparte* the order Gaviæ is made to consist of two tribes, the *Totipalmi* and the *Longipennæ;* the latter containing two families,—*Laridæ* and *Procellariidæ*—the differences between which essentially rest in the linear or tubular form of the nostrils; for continuity or division of the corneous rostral envelope does not always point to one or the other family, as the *Lestridinæ* of the *Laridæ* have somewhat the features of the *Procellariidæ* in this respect. In this arrangement an essentially brachypterous bird,—one truly a "diver" rather than a "flyer" in the sense in which these words are technically apposed—is classed among the Longipennines.

If a tubular rhinotheca be really the most essential feature, and at the same time of no more than family value, then its modifications may with propriety be held as indicative of three subfamilies *Diomedeinæ*, *Procellariinæ*, and *Halodrominæ*. But it is questionable whether such be indeed the case. An approach to this feature is seen in the *Lestridinæ*, (of a family otherwise exhibiting strictly linear basal nostrils, and an undivided rhynchotheca;) in which the so-called "cere" is really a segmentation of the corneous envelope and probably also indicative of tubulation of the nares. It is by no means proven that the peculiar nostrils of the *Procellariidæ* as generally defined, should not be held as subsidiary in importance to, or at least of no more than coördinate value with, other points of structure. Upon such an hypothesis the birds now called *Procellariidæ* would be divisible into three families, somewhat according to the following schedule:—

I. Tridactyle.

A. Macropterous; "flyers;" the tubular nostrils disjoined, lateral, horizontal..... *Diomedeidæ.*

B. Brachypterous; "divers;" the tubular nostrils united, culminal, vertical..... *Halodromidæ.*

II. Tetradactyle.

Macropterous; "flyers;" the tubular nostrils united, culminal, horizontal..... *Procellariidæ.*

But this arrangement is as faulty as the others, in the presence of an incongruous brachypterous element; and we should moreover be obliged to recognize a tribe or suborder for the three families thus collocated.

It will be evident, therefore, that so long as we regard a tubular rhinotheca as a primary fundamental character, not permitting of a wide separation of the forms in which it is present, we shall bring into juxtaposition certain types widely dissimilar from each other in most other respects; and that we do not obviate this difficulty when we make this character indicative of a suborder, under which several families may be ranged, any more than in considering it as of family importance, and forming our subfamilies upon its modifications. In either case we are met by the same objection. It remains to be proven that tubulation of the external nares is not a feature of subordinate importance to others, and as such, one which may coëxist in types otherwise presenting a widely diverse assemblage of characters. In which event, at least one genus now held as Procellaridian will be found to constitute a family of quite a different suborder; and certain others will form at least a family distinct from that of the Petrels proper. The test of anatomical investigation must be applied before the question can be definitely settled; for in one sense external characters of every sort are but the indices, as it were, of fundamental struc-

* Schema Systematis Ornithologiæ, Compt. Rend. xxxvii. 1853.

tural modifications; and as such unavailable for the truly scientific definition of groups of a higher grade than families.

In calling attention to the foregoing considerations, I wish to be understood as offering no opinion upon the questions involved, and particularly as by no means asserting that the Halodromes are not true Procellaridians. It is rarely of use to exchange one doubtful opinion for another; and for the present I shall follow the usually received classification. But it is safe to affirm that by the determination of the proper affinities of these birds the exact value of the character of tubulation of the rhinotheca is to be ascertained.

Subfamily *DIOMEDEINÆ*.

In a careful study of the Albatrosses, the interesting fact becomes evident, that we have an easy and convenient means of accurate diagnosis of species in the characters afforded us by the bill alone. All the known species differ from each other by perfectly tangible and readily appreciable variations in the size, shape and color of the bill; in the configuration of its several corneous elements, and in the outline of the feathers around its base. This latter feature, conjointly with the shape of the corneous covering of the culmen in that portion of its extent which is posterior to the nares, gives us such reliable data that we need hardly enquire further. I shall, therefore, in the following pages confine myself chiefly to detailed descriptions of the bill; and it will be noticed, as supporting the foregoing assertions, that a synoptical table may be drawn up solely upon the characters mentioned above.

As we shall study the bill somewhat in detail, I introduce, for convenience of description, several words expressive of the different corneous elements which cover it; the meaning of which will be obvious. I may remark that the piece interposed between the inferior mandibular rami at the lower border of their symphysis (here called the "interramicorn,") is a feature which also definitely characterizes this group, as it is present in no other. The presence of a well defined membranous fringe on the exterior toes is also highly characteristic.

In the following pages I describe eleven species—one of them supposed to be new—and indicate the possible existence of a twelfth. Of these one differs so much from the rest that it may be properly made the type of a genus distinct from *Diomedea*. The remaining species have also been subdivided into several genera, chiefly by Prof. Reichenbach. Such a collocation of species is certainly natural, regarded as simply expressive of the fact that certain of them are more intimately allied to each other, than they are to the species of another group; but the differences presented seem hardly sufficient to warrant our attaching generic import to them. The following will serve to explain the point alluded to.

Group A. Comprising *exulans*, *brachyura*, *nigripes*, *gibbosa*. Of largest and medium size. The bill is very broad, stout and heavy; and especially very wide at its base, and is uniform in color. The colors of the plumage are white, variegated with black, especially upon the wings; or uniform fuliginous. The tail is very short. The nostrils are large, and wide. *Exulans* may be considered as typical of this group. The length of tail reaches its minimum in *brachyura*, upon which character Prof. Reichenbach founds his genus *Phœbastria*.

Group B. Comprising *melanophrys*, *Gilliana*, n. sp. *cauta*, *culminata*, *chlororhyncha*, *olivaceirostris*. Of medium and rather small size. Bill shorter, weaker, and considerably compressed, usually bright or parti-colored. White, with black back and wings. Tail long, slightly rounded. *Melanophrys* may be taken as the type of this group, which constitutes the genus *Thalassarche* Reich. Both *melanophrys* and *Gilliana* differ from the other three species in the character of the culminicorn, as will be hereafter more particularly elucidated.

So varying are the characters of shape of bill, outline of frontal feathers, length of tail, etc., that I think they can hardly be made typical of distinct

genera. *D. fuliginosa* itself would be hardly separable were it not for the presence of some features radically distinct from, and not merely a modification or varying combination of those presented by *Diomedea* proper.

DIOMEDEA Linnæus.

Diomedea, Linnæus, S. N. 1758, and of authors. Type *D. exulans.*
Phœbastria, Reichenbach, Syst. Av. Type *D. brachyura* Temm.
Thalassarche, Reichenbach, Syst. Av. Type *D. melanophrys* Boie.

Under this head I shall consider all the species of Albatross except *D. fuliginosa*. Its general characters have already been sufficiently elucidated. The points of difference between it and *Phœbetria* will be found in the synoptical table at the end of this article.

Diomedea exulans Linnæus.

Diomedea exulans, Linn. S. N. i. 1766, p. 214; and of authors. Pl. Enlum. No. 237.—Vieill. Gal. pl. 295.—Gould, B. Aust. pl. 38, etc.
Diomedea spadicea, Gmel. S. N. i. pt. ii. 1788, p. 568.—Lath. Syn. v. 1785, p. 308, No. 2.—Lath Ind. Orn. ii. 1790, p. 790.—Lath. Gen. Hist. 1824, x. p. 52, No. 2; (excl. Var. B.) Banks ic. ined. t. 25, fide Gray. *Young.*
Diomedea albatrus, Pallas, Zoog. Rosso-As. ii. 1811, p. . Forster, Desc. Anim. ed. Licht. 1844, p. 27.
? Diomedea adusta, Tschudi, Cab. Journ. f. Ornith. 1856, p. 157, sp. 7.

Habitat.—Southern Hemisphere at large; ranging to a considerable distance north in the Pacific.

The great size of this species renders it easy of recognition in any of its very diverse plumages. I will confine myself to a description of the bill, the general features of which may be taken as the standard of reference for all the species of the subfamily.

The frontal feathers form a rather obtuse angle on the forehead, whence they run forward on the side of the upper mandible to a point a little posterior to the root of the nostrils; whence, with a slight backward obliquity, they extend to the commissure. On the side of the lower mandible they come forward far beyond those on the upper, and have a very convex—almost angular—outline. This latter feature is constant, and of great value in distinguishing small *exulans* from large *brachyura* when both are in fuliginous plumage. (Compare outline as described under *brachyura.*) The point of greatest extension is nearly opposite the middle of the nostrils. The frontal feathers form a more reëntrant concavity on the forehead, and a more salient convexity on the side of the lower mandible, than in any other species except *fuliginosa.*

By gentle maceration in warm water, into which a little potassa or soda has been thrown, the various corneous elements of the bill readily separate from it and from each other, so that we can advantageously study them.

The "culminicorn" is transversely broad and rounded, but may be somewhat compressed or even a little carinated; a great difference in these respects being observable in a large series of bills. Its dorsal outline descends in a nearly straight line from the base to the middle of the bill; whence it more rapidly rises with much concavity to the base of the unguis. Its inferior border is curved with a convex border from its distal extremity to the nostrils; then a considerable concavity is formed by the cutting away of a space for the emergence of the nostrils. Behind these, it again dips down with a salient convexity to join the upper edge of the latericorn; their union, however, being rather a point than a line. The outline of the base corresponds with that of the frontal feathers above given; and there are usually found a few corrugations parallel with this outline. The distal extremity is more or less fused with the superior unguicorn or dertrotheca, especially on the median line of the culmen.

The "latericorn" corresponds in its superficies with the shape of the mandi-

bular ramus of the intermaxillary. Its superior border is nearly straight for its whole length; no emargination existing opposite the nostrils, nor hardly any decurvation in its terminal portion. A corneous ridge, incompletely fused with it, separates its true superior border from the inferior border of the culminicorn—occupying the length of the sulcus from the nostrils to its termination. Its inferior border is sharp and regularly curved in outline for its whole length. Internal to the commissural edge, it extends as an exceedingly delicate, thin lamina to line the roof of the mouth, fusing, anterior to the palatal fissure, with its fellow of the other side; more posteriorly distinct, and descending to cover the large swollen palatal bones, which latter make a prominent ridge on either side of the roof of the mouth towards its posterior part. The basal outline of the latericorn is that of the lateral frontal feathers, as above described. It terminates in an acute angle anteriorly.

The "unguicorn" or dertrotheca is large and strong, in size, shape and general appearance calling irresistibly to mind the claw of one of the large *Felidæ*. It is much thicker, heavier and stouter than any other of the corneous elements. The convexity of its dorsal outline is great, being more than the quadrant of a circle. Its commissural edges are thin and sharp, very concave in outline: usually with an obsolete tooth, or, at least, a slight lobe.

The "naricorn" or rhinotheca is an irregularly convoluted little scroll, very thin, and delicate in texture. Its general shape is that of a turgid cone, whose apex presents backwards, and whose obliquely-truncated, irregularly-shaped base is anterior. This is simply inserted in the emargination of the under edge of the culminicorn, above described. A corneous parietes is wanting on the side which lies towards the median line of the bill; and, more anteriorly, there are numerous delicate convolutions, impossible to describe intelligibly. The general effect of these, however, is to produce a division into two parts of each nasal orifice, by a process which projects upwards and inwards. When the naricorns are *in situ*, the outer of these divisions, irregularly circular in shape, forms the most conspicuous part, and looks forward and a little upwards. The inner is much smaller, and hidden under a projecting ridge; and its aspect is quite lateral.

The "ramicorn" which covers the sides of the rami of the lower mandible is chiefly noticeable for the peculiar outline of its base, which, as already stated, formed the distinguishing feature of the under mandible of this species. It is deeply concave in outline; the superior cornu of the semilune running as an acute process, far upwards and backwards to the commissural termination. Terminally, the fusion with the inferior unguicorn is very incomplete. Its superior border runs downwards with a long concave sweep from base to tip; having posteriorly an obsolete groove for the reception of a ridge from the upper mandible. Inside the mouth, more anteriorly, the inner face of the ramicorn presents an elongated extensive ridge, whose superior aspect is concave, both longitudinally and transversely. This ridge rises higher and higher as it proceeds forward, till at its termination it is on a level with the commissural edge. The ridge in the bone itself is slight in size, compared with that produced by the folding over it of the heavy corneous covering.

The "inferior unguicorn" or myxotheca is subrectangular in its lateral aspect, the antero-superior angle being rounded off, and its posterior margin a little convex. Its tomial edges are sharp; and rise considerably above the edges of the bone they cover.

The "interramicorn" forms the gonal element of the bill. It is narrow, elongated and subcylindrical in shape; anteriorly completely fused with the myxotheca; posteriorly extending on the median line a considerable distance into the interramal space, running to a fine point, and very gradually merging its corneous texture into that of ordinary dermal tissue.

The general shape of the bill appears sufficiently elucidated in the preceding descriptions of its several elements. The features whereby it is differentiated from that of any other species are these: Its great size, (chord of

culmen 6·50 to 7·50;) its great breadth and strength; width and concavity of the culmen; huge, strong unguis; peculiar convolutions of the naricorn;* the outline of the feathers, *particularly* on the side of the under mandible; and the uniform, very light yellowish color. These points will always separate from *brachyura* specimens of every variety of size and color.

The *D. spadicea* of Gmelin and Latham is now universally conceded to be based upon the young of this species. Latham's *spadicea var. B.*, however, I consider to be the young *brachyura*, for reasons stated elsewhere.

Mons. R. P. Lesson, holding that *spadicea* is distinct from *exulans*, commits the curious error of citing in support of his views a note sent him by Dr. Garnot, which refers to *Phœbetria fuliginosa*.†

Diomedea adusta Tsch. seems hardly different from this species, to which it is unhesitatingly referred by Dr. Schlegel.

Diomedea brachyura Temm.

Diomedea spadicea, var. B., Lath. Gen. Hist. Birds, 1824, vol. x. p. 52, No. 2, var. B.; (cites Pl. Enl. 963).

Diomedea brachyura, Temminck, Pl. color. No. 554, adult. (cites Pl. Enlum. 963, as young.) Schlegel, Fn. Japon. pl. 66. (Young.) Gould B. Aust. vii. pl. 39, and of authors generally: excluding "*brachyura* juv." of Cassin and Lawrence, which is *nigripes* Audubon.

Diomedea epomophora, Lesson, Man. Orn. ii. 1828, p. 351.—Id. Traité d'Ornith., 1831, p. 609. Tschudi, Cab. Journ. f. Ornith., 1856, p. 156. Bp. C. A., 1855, ii. p. 185, [haud dubié.]

"*Diomedea chinensis*, Temminck."

Habitat.—Pacific Ocean at large. Abundant in the China Seas, and on the west coast of North America to a quite high latitude.

As is the case with other species, this one is readily diagnosticable by its bill alone. This is of the same fundamental character as that of *exulans;* but it is smaller, weaker, more compressed, with a vastly less concave culmen, less elevated, robust, and more attenuated and decurved unguis; and there is a very marked difference in the outline of the feathers around its base.

The frontal feathers embrace the bill in a nearly straight line as far as the lateral sulcus; forming almost no concavity on the culmen. Along the base of the latericorn, they run slightly obliquely backwards to the commissure. On the sides of the lower mandible they extend but slightly further than on the upper, having a scarcely convex outline.

The bill is stout, being especially wide at its base, which is large and heavy. Anterior to the nostrils, the culminicorn is compressed, and sometimes obsoletely carinated; posterior to them, it very rapidly flattens and widens, and extends so far downwards on either side that there is allowed no projection of the post-ro-superior corner of the latericorn. The latter, with the exception of this feature, and of a straighter commissural edge, is much as in *exulans*.

The dertrum is comparatively small: hardly rises above the level of the culmen; and is by no means so convex and hooked at the tip as in *exulans*. The myxa is longer, narrower and more attenuated.

The straightness of the commissure as compared with that of *exulans;* and the different outline of the feathers on the side of the lower mandible, are the main points wherein the outline of the ramicorns of the two species differ.

The nostrils are as in *exulans*, but smaller. The variations in plumage of

* Existing, but to a less extent, in some other species.

† Lesson, Man., 1828, ii. p 390.—'Cette espèce"—*spadicea*—"a eté regardée comme le jeune âge du *exulans;* mais nous ne partageons pas cette opinion. A ce sujet nous imprimerons textuellement une note, que nous a remise M. le Docteur Garnot * * il s'exprime ainsi * * * autour des yeux qui sont brun clair on voit un petite cercle de plumes blanches interrompu par une tache noir à l'angle interne de l'œil; le bec est noir; la mandibule inférieure presente sur ses faces deux lignes blanches membraneuses," etc., from which expressions it is palpable that a specimen of *fuliginosa* furnished the subject of the note.

this species are quite parallel with those of *exulans*, and need not detain us, as they are well known. A shining rusty yellow suffusion of the feathers of the head and neck is met with in perhaps the majority of adult specimens.

That this species is the *spadicea* var. B. of Latham, as above, when in the fuliginous state of plumage, is evidenced, if not by Latham's brief description, by his citation of Pl. Enl., No. 963, which gives correctly the outline of the frontal feathers and other points, whereby it is distinguishable from the young *exulans*. The same plate is also cited by Temminck himself as representing the young *brachyura*.

A specimen before me, unquestionably *brachyura*, is in precisely the state of plumage described under the name *epomophora* by Lesson in his works above cited, and recognized as a valid species by Tschudi and Bonaparte. The relative amount of black and white on the wings is very variable, the latter color sometimes pervading all the coverts; and at others being restricted to a small spot at the elbow, producing the appearance which suggested Lesson's name.

The questions arising from the confounding of *nigripes* Audubon with this species are discussed under head of the latter.

Note.—I find in the Smithsonian Institution a skull of an Albatross, wanting the lower jaw, in general features most like that of *brachyura*, (numerous examples of which are before me,) but differing as follows:—

It is considerably narrower and smaller in nearly all of its dimensions; the bill especially being slenderer, weaker and more compressed, with a less elevated and smaller unguis. The frontal outline is decidedly more concave on the median line. The culminicorn was narrower and less flattened basally; did not descend so low to meet the latericorn behind the nostrils, and was more convex along its dorsal outline. The fronto-maxillary suture is narrower. The palatal bones are smaller and narrower, and sink to the level of the commissural edge much sooner.

A most marked difference is seen in the supra-orbital fossa for the lodgment of the gland, whose secretion is poured into the nasal cavity. It is very small, and particularly narrow; so that the least width between it and its fellow is greater than in *brachyura*, although the skull is narrower. These fossæ have no floors whatever on their anterior halves.

Numerous other minor differences may be summed up as resulting from the smallness and narrowness of the skull, which is well illustrated by the following measurements. It will be noted that the bill is absolutely longer, and therefore still more comparatively elongated than in *brachyura*.

Dimension.	*D. brachyura.*	*D. leptorhyncha.*
Fronto-maxillary suture to tip of bill	5·40	5·75
" " " " occiput	2·75	2·37
Greatest width of bill	1·37	1·08
" " " skull (at post-orbital processes)	2·62	2·37
Width of fronto-maxillary suture	1·00	0·93
Length of suprà orbital fossa	1·30	1·07

Upon these meagre, though decided data, I do not like to formally introduce a species; and must, therefore, for the present, content myself with pointing out the differences which exist in the specimen to which I have affixed the above name of *leptorhyncha*.

Diomedea nigripes Audubon.

Diomedea nigripes, Audubon, Orn. Biog. v. 1839, p. 327. Audubon, Birds Amer. vii. 1842, p. 198. [West coast Amer.] Cassin, Illust. B. Cal. & Texas, 1853, p. 210, pl. 35. [Cala.] Schlegel, Mon. *Proc.* Mus. Pays-

[May,

Bas, 1863, p. 33. [China.] Swinhoe, Ibis, 1863, p. 431. [China Seas.]

Diomedea brachyura juv. Cassin, Illust. B. Cal. & Tex., 1853, p. 291. Lawrence, Baird's B. N. Amer., 1858, p. 822.

Habitat.—North Pacific. Coasts of Asia and America.

*Description.** Bill about a third longer than the head, slightly surpassing the tarsus, equal to the middle toe without its claw: comparatively stouter, and basally wider, than that of any other species (except *gibbosa?*). The culmen is perfectly straight to the middle of the bill; and has thence only a just appreciable concavity to the unguis; which latter is weak and small, scarcely rises above the level of the culmen proper, and is only moderately decurved and acute. The culminicorn is moderately wide, and subcarinated beyond the nostrils; posterior to them it is flatter and wider, spreading down so far on either side as to *overlap* the upper edge of the latericorn. Its comparative width is greater than in any other species. Although the basal outline is essentially rounded, as in *brachyura*, there is yet a slight angle formed on the median line, readily perceptible, which is not the case in *brachyura*. The great comparative width of the bill is produced chiefly by the turgid and protuberant latericorns, which give it an air of great thickness and solidity. The lateral sulcus is nearly straight from nostrils to unguis, and thence is only slightly decurved. The commissure is almost straight to the unguis. The outline of the inferior mandibular rami is quite straight to the inferior unguis, the point of which is somewhat elongated and decurved. The interramicorn is small and short, though quite convex in outline. The feathers on the side of the lower mandible extend further than on the upper; their outline has a gentle convexity. The nostrils are of moderate size; very short; rather obliquely placed, presenting upwards and forwards; and the emargination of the culminicorn, to allow of their protrusion, is very deep.

The tail is of moderate length, contained about three times in the wing from the carpal joint; is nearly square, the feathers having but a slight graduation, and all being broad to their very tips. (The tail of *brachyura* is contained about $3\frac{1}{2}$ times in the wing.)

The tarsus is less than the middle toe without its claw, about equal to the inner without its claw; slender, moderately compressed. The outer toe is longer than the middle; the tips of the claws fall together. The tip of the inner claw about reaches the base of the middle one.

The plumage is dark chocolate brown; lighter and rather tending to plumbeous gray on the under parts generally. Some of the dorsal feathers, and most of the wing-coverts, have light grayish brown edges, as if faded; and a few feathers on the elbow are whitish except terminally. The region all around the bill is hoary white for a limited space; and then shades rapidly into the prevailing color of the head. A streak over and behind the eye and a spot just in front of it are nearly pure black. The primary quills are black, with a plumbeous cast on their inner vanes; their shafts bright yellow to near the tips. The tail is brownish black; paler below; the shafts dull whitish except apically. The long upper tail coverts which reach within one and a half inches of the end of the tail, are lighter brown than the rest of the upper parts, having sometimes a slight rufous tint. The feet and webs are black. The bill in the dry state is dark brown, almost black on the nail; its basal portions with a hoary glaucescence, its median portions tinged with reddish brown.

Chord of culmen 4·00, its curve 4·60, from feathers on side of upper mandible to its tip 3·50; ditto lower mandible 3·20; height of bill at base 1·50; greatest width 1·25. Tarsus 3·70; middle toe and claw 4·50, outer do. 4·50, inner do. 4·00. Wing 19 to 20. Tail about 6·50.

The preceding paragraphs are descriptive of a most excellent species of Al-

*Taken from several typical examples from the coast of California in Mus. Smiths.

batross, very abundant in the North Pacific. It is readily distinguishable from the young *brachyura*, to which it assimilates so closely in its plumage, by its bill, which Dr. Schlegel has happily described as "très court, quoique gros." The shortness of the bill; its great width, especially basally where the culminicorn is so broad and descends so low as to overlap the latericorn; the general straightness of its several outlines, and its color; the relative proportions of the wings and tail; and the proportions and color of the feet, all furnish data ample for its separation from *brachyura*. So far as now known, the fuliginous plumage above described is its only one; but should it ever assume a livery like that of *brachyura*, still the above points of form will readily characterize it. The only question then is as to the name to be employed for it. American writers have without exception identified the "*nigripes*" of Audubon with the young *brachyura*.

Unfortunately I cannot find the type specimen of *nigripes* among the many types of other species of Mr. Audubon now in the Smithsonian Museum. I have before me the types of his "chlororhynchos" and "fusca;" but "nigripes" has been mislaid. We have therefore only his description as a guide; from which we must determine whether he had in view the present species or a young *brachyura*, also found on the Pacific coast of North America. In the latter event *nigripes* would become a synonym, and a new name be required for the species now under consideration.

Examining the dimensions given by Audubon we find several discrepancies. In general they may be stated as too large. The bill is by no means "five" inches long,—especially along the edge of the under mandible. The tail is six or more instead of "three" inches. The dimension given for the inner toe ($1\frac{1}{2}$) is doubtless a typographical error. By carefully measuring Audubon's specimen of "chlororhynchos," I find that he took the *curve* of the culmen, not its chord. Applying this test to the specimens before me they measure 4·50 to 4·75 inches; which is sufficiently near the dimensions he states. But five inches along the edge of the under mandible is too great, even for the majority of adult *brachyura;* while three inches as the length of tail, is wide of the mark for either species. Eliminating palpable errors however, there is nothing in his description or measurements absolutely incompatible with the present species, though much confirming a suspicion that he may really have had a young *brachyura* in view; and I therefore think it best, at least until his type can be found, to accept his name, now well established, for this species, especially as the necessity for a new one will thereby be obviated.

Diomedea gibbosa Gould.

D. gibbosa, Gould, Ann. Mag. N. H. 1844, xiii. p. 361. Id. Introd. B. Aust. 1848, p. 115.

Habitat.—"North Pacific."

Of this species, which is autoptically unknown to me, Mr. Gould says: "It differs from every other that has come under my notice in the peculiar swollen and raised form of the upper mandible, which moreover rises high up on the forehead;" and further describes it as having the "face, ear coverts, chin, abdomen, upper and under tail-coverts white: the remainder of the plumage very dark brown approaching on the occiput, back of the neck, and wings, to black; bill yellowish horn color, becoming darker at the tip and at the base: feet in the specimen dark brown, but doubtless of a bluish gray, inclining to flesh color, in the living bird. Total length 30 inches; bill 4; wing 21; tail 7; tarsi 4."

This supposed species is by Mr. G. R. Gray placed as a synonym of *nigripes* Audubon. The dimensions and description in general accord well; and certain points of difference of coloration may be dependant upon age. It is not impossible that *gibbosa* is based upon the fully adult *nigripes*, in a plumage unknown until described by Mr. Gould. But comparisons of specimens are

requisite to settle definitely, this point, upon which at present I have no opinion to offer.

Diomedea melanophrys Boie.

Diomedea melanophrys, Boie, Temm. Pl. Col. No. 456. Gould, B. Aust. pl. 43; and of authors generally.

Habitat.—Southern Oceans generally.

The bill is moderately compressed throughout, least so at the base where it is very high or deep. The culmen is transversely rounded, non-carinated; its dorsal outline moderately concave, descending from the forehead nearly in a straight line to near the middle of the bill, whence it gradually ascends to the unguis. The latter is very convex and much decurved, though not rising so high as in some other species. The culminicorn basally descends a little on either side to overlap the roots of the nostrils, and to coalesce with the latericorn; no space of soft skin being interposed. The lateral sulcus follows very nearly the curve of the culmen, to near the unguis, where it rapidly decurves. The commissural edge of the upper mandible is lightly curved. The outline of the rami of the inferior mandible is nearly straight; the interramicorn somewhat protuberant, and extending far into the submental space. The inferior unguicorn is much compressed, not very deep, its apex rather acute, but little attenuated.

The nostrils are short and small; quite different in this feature from those of *exulans* or *brachyura*. They are subconical in general shape; being considerably dilated anteriorly, and basally narrowing to a point; their orifices considerably dilated, with thin margins; suboval in shape, looking upwards and forwards. This description of nostril is applicable to the other species of this subdivision of the genus.

The frontal feathers embrace the base of the bill in a nearly straight line; having a slight forward obliquity, however, as they descend on the sides of the upper mandible. On the culmen a very slightly reëntrant curve (not angle) is formed. On the side of the lower mandible the feathers begin slightly posterior to their termination on the upper; extending somewhat forward, and with a slight convexity, as they go downwards.

The bill is yellow, more or less pure and uniform in tint; in immature birds clouded with brown. Some portion of the unguis is usually dark colored. The soft skin at the extreme base of the bill makes a narrow black line all around.

White; back plumbeous black, more cinereous anteriorly, where it merges gradually into the white of the neck. Wings and tail black; the latter with a grayish or plumbeous tinge, especially basally. Shafts of quills yellowish, becoming black terminally. Shafts of tail feathers white throughout. A cinereous black transocular fascia. "Legs and toes yellowish white, the interdigital membrane and the joints washed with blue." (Gould.)

Chord of culmen 4·25; height at base 1·75; width 1·00; from feathers on side of lower mandible to its tip 3·75. Tarsus 3·25; middle toe 4·75; outer 4·50; inner 4·00. Wing 20·00; tail 9·00; its graduation 2·00.

Diomedea Gilliana Coues, nov. sp.

Belonging to the group of white, black-backed Albatrosses of which *melanophrys* is typical, and with the characters of the culminicorn generally as in that species. The shape of the bill, however, most nearly approaches that of *culminata*; but the characters of the culminicorn posterior to the nostrils are quite diverse from those of the latter species, as follows:—

Instead of continuing, between the nostrils and the forehead, no broader than it is anterior to them, it there widens, descending on either side to overlap their roots, and to coalesce by a simple sulcus with the upper edge of the latericorn. There is thus left no space to be filled by soft skin. The dorsal

outline of the culminicorn is not so concave as in *culminata;* does not begin to curve downwards so immediately from the forehead; does not dip so low down at the middle of the bill; is less flattened and depressed on top, and has a more decidedly rounded transverse outline. The culminicorn has considerably more of lateral extension downwards before it reaches the lateral sulcus.

The outline of the frontal feathers shows an approach to the character seen in *fuliginosa;* the root of the culmen extending nearly as far up on the forehead as in *exulans.* Still the outline is a simple concavity, not a sharp reëntrant angle. On the sides of the lower mandible the feathers start a little posterior to their termination on the upper and curve downwards and considerably forwards with a decidedly convex outline.

The base of the culminicorn and latericorn are transversely rugose; the corrugations being mainly parallel with the outline of the frontal feathers.

The lateral sulcus is gently curved from base to unguis; and on its ungual extent is less deflected than in any other species. The interramicorn is prominent; and extremely elongated before it finally looses itself in the submental space.

In the dried specimen the bill presents none of the bright parti-coloration of *culminata, chlororhyncha,* and *cauta;* while its color as well as its shape are sufficiently diverse from those of *melanophrys.* It is a plain uniform olivaceous brownish throughout; the ungues darker, and inclining to black; the extreme tip of the upper mandible yellowish. That this color is not an evidence of immaturity is evinced by the plumage which is palpably that of a fully adult bird.

Chord of the culmen 5·00 inches. Height of bill at base 1·75; at middle slightly over one inch; at unguis 1·12. Width at base 1·45. Tarsus 3·00; middle toe 4·75, outer toe 4·60, inner toe 4·00. Wing about 20 00; tail about 9·00.

The coloration of the plumage is that of *melanophrys* and the rest of this group, with this exception: The whole under surface of the wings is concolor with the upper; whereas in the other species a large area is white.

In carefully examining the superb series of Albatrosses in the Philadelphia Academy, which contains examples of all known species except *olivaceirostris* and *gibbosa*, I find a specimen of which the preceding paragraphs are descriptive. It is unlabelled as to name, locality or donor; and Mr. Cassin has no recollection whence it was obtained. I find it impossible to refer it to any known species; and am therefore constrained, somewhat reluctantly, to regard it as a previously undescribed one. I am autopically familiar with all the recognized species except *olivaceirostris* and *gibbosa.* The former of these is said to have a bill "3 inches and three-eighths long from the *gape* to the tip, and of a uniform olive green, and in form more slender and elegant," etc.; with which description the characters of our bird are totally discordant. There is no "peculiar swollen and raised form of the upper mandible" suggestive of the name *gibbosa*, or rendering its reference to that species admissable.

From *chlororhyncha, culminata,* and *cauta* it is at once distinguished by the color of the bill and especially by the lateral extension downwards of the base of the culminicorn, and its coalescence with the latericorn, thus cutting off the naked space which exists behind the nostrils of these species.

Agreeing in this latter respect with *melanophrys*, the shape no less than the coloration of the bill, as well as the peculiar color of the under surfaces of the wings forbid its reference to that species. Until these features are shown to be accidental, or not incompatible with the variations to which *melanophrys* is subject, the species must be regarded as a valid one; since there are no others than those above compared, to which it bears any sort of resemblance.

I trust that this species may prove valid, if for no other reason than that it may continue to bear the name I have fixed to it in pleasant remembrance of years of uninterrupted friendly intercourse; although Professor Theodore Gill needs no such slight tribute from me, to enhance the enviable reputation to

[May,

which his extensive researches in almost every department of Zoology so justly entitle him.

Diomedea cauta Gould.

Diomedea cauta, Gould, P. Z. S. viii. p. 177. Id. Ann. Mag. Nat. Hist. xiii. 1844, p. 360. Id. B. Aust. pl. 40. Gray, Gen. Birds, (plate of bill), and of authors.

Habitat.—From the south coast of Van Diemen's Land.

A beautiful species having the colors of plumage of the *melanophrys* group; readily distinguishable from all other species by the following peculiarities in the shape and color of the bill, and outline of the frontal feathers.

The frontal feathers lie in a straight or slightly convex outline across the base of the culmen, and then descend perpendicularly to the commissure; forming a slight reëntrant angle on each side of the base of the culminicorn. From exactly opposite their termination on the commissural edge of the upper mandible those on the lower start, and descend in a straight line with a slight forward obliquity, forming a very obtuse angle with those on the upper mandible.

The dorsal outline of the culmen descends from the forehead with a gentle curve, to rise again on the unguis, but not so high as at the forehead. The point of greatest concavity is opposite the middle of the bill. Basally the culminicorn agrees with that of *culminata* and *chlororhyncha*, and differs from *melanophrys*, in not widening behind the nostrils, nor descending to overlap their bases and meet the upper edge of the latericorn; a narrow subrectangular space thus left being covered only with soft skin.

The latericorn is very broad throughout as compared with the culminicorn; *i. e.*, the lateral sulcus is placed high up. The latericorn is exceedingly deep at its base, running high up towards the sides of the base of the culminicorn, and, in consequence of the strong upward inflection of the commissure towards its base, the sides of the under mandible are also very deep basally, and run high up to form an acute angle with the feathers at the commissure.

The nostrils present no discrepancies from other species of this group.

"Bill light vinous gray or bluish horn color, except on the culmen where it is more yellow, particularly at the base; the upper mandible is surrounded at the base by a narrow belt of black, which also extends on each side of the culmen to the nostrils; base of lower mandible surrounded by a belt of rich orange, which extends to the corners of the mouth." (Gould.)

Chord of culmen 4·75; height at base 1·90; width 1·25; height at unguis 1·25; from feathers on lower mandible to the tip of its unguis 3·75. Tarsus 3·25; middle toe 5·00; outer toe 4·75; inner 4·25; wing 22·00; tail 10·00.

The plumage is that of *melanophrys* even to the transocular dark fascia; but this in the specimen before me extends quite to the bill, which is not the case in the numerous specimens of *melanophrys* examined.

A suffusion of the head and neck with pearly gray is doubtless indicative of immaturity, as is the case with other species.

This bird is superbly figured in Mr. Gould's and Mr. Gray's plates cited above. The latter is an exceedingly accurate delineation of the bill.

Diomedea culminata Gould.

Diomedea chlororhynchos, of Audubon's Works; witness the type specimen itself. Lawrence, Gen. Rep. Birds, N. A., 1858, p. 822. (Excl. syn.)

Diomedea culminata, Gould, Ann. & Mag. N. H. 1844, xiii. p. 361. Id. B. Aust. vii. pl. 41. Gray, Gen. Bds., 1849, pl. 179.

This species in color of plumage is quite identical with *chlororhyncha*, and the bill, in its general characteristics of shape, most resembles that of the latter species. But the bird is much larger, stouter and heavier, as will be seen by comparing the dimensions given. The bill in general terms may be stated to be heavier and stronger, though not longer than that *chlororhyncha;*

much less compressed; deeper at the middle, notwithstanding that the concavity of the culmen is much greater; and with other well-marked peculiarities, as follows:—

The dorsal outline is exceedingly concave, dipping down rapidly from the forehead, and then again being much elevated on the ungual portion. The culminicorn is broad, flattened, depressed, with no trace of carination. Its colored base, instead of being acutely pointed, (as in *chlororhyncha*,) continues of a uniform width past the nostrils to the feathers, where it is broadly rounded with a gentle convexity. There exists posterior to the nostrils a naked space of soft skin; but this is trapezoidal, not triangular in shape, in consequence of the different shape of the base of the culminicorn, just described.

The lateral sulcus is nearly straight to the unguis, where it is greatly deflected. It runs high up along the bill; or rather the dorsal outline of the culmen dips, towards the middle of the bill, so far down, that it almost lies on a level with this sulcus. The culminicorn is thus allowed scarcely anything of a lateral aspect in the middle portion of its extent. The latericorn, as a consequence, is very deep throughout, and its commissural outline is decidedly less curved. The two ungues are stout, deep and short; with considerable more convexity of outline, and less elongation and decurvation of their apices than is seen in *chlororhyncha*.

The dorsal outline of the inferior mandibular rami is quite straight. The interramicorn is prominent, but not so long as in *chlororhyncha*.

The outline of the feathers is almost exactly as in *melanophrys*; *i. e.*, they lie over the base of the culmen in nearly a straight line, or with a slight concavity; and thence extend nearly straight down the sides of the bill. There is no trace of the reëntrant angles at the sides of the base of the culminicorn seen in *chlororhyncha*. The feathers on the lower mandible have the same outline as those of *melanophrys* or *chlororhyncha*.

The colors of the bill are quite different from those of any other species, though coming nearest to *chlororhyncha*. The culminicorn is clear light yellow; (not bright orange;) and the edges of the inferior mandibular rami for three-fourths their extent are also yellow. There is no yellow line along the sides of the base of the lower mandible at its junction with the feathers. The rest of the bill is black. "In its youthful state the head and neck are dark gray, and the bill is of an almost uniform brownish black, with only an indication of the lighter color of the culmen." (Gould.)

The plumage is quite the same as that of *chlororhyncha*. The color of the back is darkest posteriorly, being anteriorly more plumbeous, and shading into the grayish pearl which washes the neck and head of the majority of specimens. Usually the feathers about the eyes are more or less dark-colored.

In young birds the whole head and neck is clouded with plumbeous gray; and the transocular fascia is more conspicuous.

Bill (chord of culmen) 4·50; height at base 1·75; at middle 1·10, at unguis 1·25; width at base 1·20. Tarsus 3·25; middle toe 5·00, outer toe 4·75, inner toe 4·25. Wing 21·00. Tail 8 to 9.

I have before me Audubon's type of the "*chlororhynchos*" of his works. It is an example of *culminata* Gould; and was doubtless procured elsewhere than "not far from the Columbia River," as falsely stated. This specimen (No. 2726 of the Smithsonian Register) is also described by Mr. Lawrence, l. c., under the same name.

I have a distinct impression of having seen, in some old work, a plate of this species (as evidenced by the yellow along the ramus of the under mandible instead of at its feathered base) under the name of "*chlororhynchos*;" but I cannot now call to mind the reference.

DIOMEDEA CHLORORHYNCHA Gmelin.

Diomedea chlororhyncha, Gm. i. 1788, p. 568. Lath. Syn. v. p. 309, pl. 94.

[May,

Lath. Ind. Orn. ii. 1790, p. 790. Temm. Pl. Col. 468. Gould, B. Aust. pl. 42, and of authors generally; but not of Audubon and Lawrence.

Diomedea (*Thalassarche*) *chlororhyncha*, Bp. C. A. ii. 1855, p. .

"*Diomedea chrysostoma*, Forst. Ed. Licht, 1844, p. 24. "Id. ic. ined. 100, 101," fide Gray.

"*Diomedea profuga*, Banks, ic. ined. t. 27," fide Gray.

"*Diomedea presaga*, Brandt," fide Lawrence.

Habitat.—Cape of Good Hope, and thence to Van Diemen's Land. Australian and South Pacific Oceans generally.

The bill is compressed in its whole extent more than in any other species except *fuliginosa*; and although somewhat stouter at the base, it is there very high as compared with its width. Its dorsal outline is very concave, descending rapidly from a point a little anterior to the extreme base of the bill, to about the middle; and not rising again very high on the unguis. Although the culminicorn is narrow and with compressed sides, it is not carinated along its dorsal line. It has a peculiar termination basally, quite unique in the genus, which single character separates it trenchantly from any other Albatross. The culminicorn does not (as in *exulans*, *melanophrys*, etc.,) spread downwards and outwards behind the nostrils to overlap their bases, but terminates by rapidly narrowing to an acute angle on the median line of the bill. Its hard, brightly colored, pointed base does not quite reach to the feathers. There is thus left, between the base of the culminicorn and the upper edge of the latericorn, a somewhat triangular space of softish integument, not brightly colored; and corrugated in the dry state.

The lateral sulcus on the upper mandible does not extend further towards the base of the bill than the nostrils: the soft skin just spoken of taking its place thence to the feathers. Beginning then with the nostrils, it has a slight downward convexity as far as the unguis; thence it is greatly deflected. As usual, a slight ridge lies in this sulcus for its whole length. The commissural edge of the upper mandible is strongly curved, its convexity looking downwards. The dorsal outline of the inferior mandibular rami is straight or very slightly concave. The interramicorn is thin, not very prominent, but prolonged far along the chin before it merges into soft skin.

The two ungues, taken together, are characterized by their slight comparative depth and degree of convexity, and their extreme compression and elongation; and by the acuteness and decurvation of their apices.

The nostrils are exactly as described under *melanophrys*.

The frontal feathers are peculiar in outline. They lie straight across the base of the culmen, or even have a slight convexity, as far as the upper corner of the base of the latericorn. Thence they descend the side of the bill, with a slightly convex outline, and some little obliquity forwards; forming more decidedly reëntrant angles at the superior basal corners of the latericorns than is found in any other species. On the side of the lower mandible, beginning at a point slightly posterior to their termination on the upper mandible, they descend with an outline parallel to that of those on the upper mandible.

Chord of culmen 4·50; height of bill at base 1·50, at unguis 1·00; width at base 1·00. Tarsus 2·75; middle toe 4·25; outer toe 4·00; inner toe 3·75. Wing about 19·00. Tail 7·00.

White; including rump, upper tail coverts and under surfaces of the wings; back and wings ashy brown, the latter darkest. Primary shafts light brown basally, black apically. Tail grayish or plumbeous black, lightest basally; its shafts chiefly white. Some part of the head and neck in the majority of specimens is clouded with pearly gray. There is more or less of a grayish plumbeous transocular fascia, as in *melanophrys*. The culminicorn is bright orange yellow; and a narrow line of the same color lies along the sides of the base of the under mandible. The rest of the bill is blackish; there being no bright color along the dorsal outline of the inferior mandibular rami, as seen in *culminata*. The feet are livid flesh, or bluish white.

Some malapplications of the name of this species to *culminata* Gould, are noticed under the head of the latter. I quote the names "*profuga* Banks" and "*presaga* Brandt" respectively on the authority of Mr. Gray and Mr. Lawrence, not having an opportunity of verifying these references.

DIOMEDEA OLIVACEIROSTRIS Gould.

Diomedea olivaceorhyncha, Gould, Ann. Mag. N. H. 1844, xiii. p. 361. Id Introd. B. Aust., p. 115.

Diomedea olivaceirostris, Bonaparte, C. A. 1855, p. 185, correcting a hybrid name.

This species is based upon a bill only, which was in possession of Sir Wm. Jardine, and supposed to come from the China seas. Mr. Gould states that it "is three inches and three-eighths long from the gape to the tip, of a uniform olive green, and in form more slender and elegant than that of the other members of the genus," which comprises the sum total of our knowledge concerning the species.

PHŒBETRIA FULIGINOSA (Gm.) Reich.

Diomedea fuliginosa, Gmelin, Syst. Nat. i. pt. ii. p. 568. Lath. Ind. Orn. ii. 1790, p. 791. Temminck. Pl. Col. 469. And of authors generally.

Diomedea (Phœbetria) fuliginosa, Bonap. Consp. Av., ii. 1855, p.

Diomedea spadicea, Lesson, Man. ii. 1828, p. 391; description. Not of Lath.

Diomedea palpebrata, Forster, "ic. ined. No. 102." Id. Ed. Licht, 1844. p.

Diomedea antarctica, Banks, "ic. ined. No. 26."

Diomedea fusca of Audubon's works.

Habitat. Southern oceans at large.

The bill of this species is remarkable in its extreme compression; its basal outline; and the presence of a sulcus on the lower mandible.

The feathers retreat rapidly, with a gentle curve, from their point of greatest development on the commissural edge of the upper mandible to form an exceedingly acute reëntrant angle on the forehead. Those on the side of the lower mandible extend in an exceedingly acute salient angle, to a point much beyond the termination of the nostrils; their upper outline a trifle oblique to the commissural edge of the lower mandible; their under more decidedly oblique to the outline of the inferior mandibular rami.

The culminicorn is much compressed, with but slightly convex sides, and a decidedly carinated ridge. The dorsal outline forms a gentle and continuous curve from the very feathers to the base of the unguis. The latter hardly rises above the level of the culmen proper: is rather the reverse of robust; its top moderately decurved, and only slightly overhanging the lower. The curve of the superior lateral sulcus is intermediate between *exulans* and *brachyura*. The commissure forms a gentle and continuous curve from the base of the unguis.

The commissural edge of the under mandible corresponds to that of the upper. The dorsal outline of the rami is perfectly straight. The inferior unguicorn is convex and protuberant, but extends only a short distance into the mental space.

The median longitudinal lateral sulcus of the lower mandible terminates abruptly at the unguis. Basally it divaricates to receive the salient feathers; the upper crus being the best marked, and forming the real continuation of the sulcus. This groove is sometimes concolor with the bill; more often it is brightly colored, being yellow or pinkish.

The nostrils are peculiar in their very small calibre, perhaps less than that of any other species. They are almost buried between the culminal and lateral elements of the bill, the two meeting posterior to the nares. The orifice is subcircular, presenting forwards and upwards with no lateral aspect.

The graduation of the lateral rectrices is enhanced in producing a cuneate tail, by the elongation of the median pair which project beyond the next ones, and are narrowly accuminate. The tips of the lateral feathers are rounded.

The bill is black, except its sulcus. The feet are flesh colored or dull whitish, becoming yellowish in the dried state. The edges of the eyelids are pure white except just at the anterior canthus.

The perfectly and uniformly fuliginous color (darkest about the face and on the wings and tail) which is the ordinary plumage, sometimes gives way to a much lighter, clearer and more cinereous color. Examples of this coloration, doubtless due to age, are in the Philadelphia Academy and Smithsonian Institution. The most extreme case I have met with is as follows: Neck all around, upper part of back and whole under parts nebulated with ashy or grayish white. Lower part of back, wing-coverts, scapulars, etc., light plumbeous gray. Wings and tail ashy or plumbeous blackish, lightest on their inner webs, their shafts chiefly whitish. On the face, crown and sides of the head the fuliginous holds, deepest in tint immediately around the bill. The nape and hind neck, and some of the wing coverts show traces of ferrugineous.

Chord of culmen 4 to 4·50, height of bill at base 1·50, at unguis 1·00, width at base ·75. From feathers on commissure to tip 3·50, from feathers on lower mandible 2.50. Tarsus about 3·00; middle toe and claw 4·75, outer 4·50, inner 4·00. Wing 21·00, tail ·10, its graduation 3·50 to 4·50.

I have examined the type of *Diomedea fusca* Aud. now in the Smithsonian Institution.

The following is a synopsis of the genera and species of the *Diomedeinæ*.

Family *PROCELLARIIDÆ*.

Sub-family *DIOMEDEINÆ*.

Chs. The tubular nostrils are separated, and placed on either side of the culmen. The hallux is absent. The exterior toes have a wide membranous fringe.

Genus I. *Diomedea*. Bill stout, or moderately compressed. No sulcus on lower mandible. Tail short or moderate, more or less rounded. Nostrils large.

A. Bill very broad. Tail short; contained nearly, quite, or more than three times in the wing..... .....*Diomedea et Phœbastria* Reich.

1. D. EXULANS L. (*spadicea* Gm. Lath. (juv.) *albatrus* Pall. Forst., *adusta* Tsch. Bill 7 inches. Frontal feathers forming a deep concavity on the culmen; those on side of lower mandible extending to a point opposite middle of nostrils, with an exceedingly convex outline.

2. D. BRACHYURA Temm. (*spadicea* var. B. Lath. (juv.) *epomophora* Less. Tsch. Bp.) Bill 5 to 6 inches. Frontal feathers embracing the bill nearly in a straight line: those on side of lower mandible extending hardly further than on upper, with a barely convex outline.

[2a? D. LEPTORHYNCHA Coues. Doubtfully based upon a skull differing somewhat in proportions from that of *brachyura*. See anteà.]

3. D. NIGRIPES Aud. (*brachyura* juv. Cass. Lawr.) Bill 4 inches; width at base 1·25; height 1·50; very robust for its length. Frontal outline nearly as in *brachyura*.

?4. D. GIBBOSA Gould. "With a peculiar swollen and raised form of the upper mandible, which moreover rises high up on the forehead. Bill 4." (Probably = *nigripes* Aud.)

B. Bill compressed. Tail elongated, rounded, nearly half as long as the wing from the carpal joint. White, with black back and wings. A transocular fascia..... ....(*Thalassarche* Reich.)

a. The culminicorn widens and descends on either side behind the nostrils to coalesce with the latericorn.

5. D. Melanophrys Boie. Temm. Frontal feathers with a slight reëntrant curve on the culmen. Chord of culmen 4·25. Width of bill at base 1·00; height 1·75. Bill uniform light yellow.

6. D. Gilliana Coues. Frontal feathers with a decided reëntrant curve on the culmen (nearly as great as in *exulans*.) Chord of culmen 5·00; width of bill at base 1·45; height 1·75. Bill uniform dark brown. (Essential characteristics of culminicorn of *melanophrys;* general shape of bill of *culminata*.)

b. The culminicorn does not widen and descend to coalesce with the latericorn posterior to the nostrils, but continues narrow to the frontal feathers.

7. D. cauta Gould. Chord of culmen 4·75. Frontal feathers with a slightly convex outline across the culmen: thence descending in a nearly straight line. Bill gray or bluish brown; the culmen yellowish; a narrow belt of black around base of upper mandible; one of orange around base of lower, the latter extending to the angle of the mouth.

8. D. culminata Gould. (*chlororhyncha* Aud. Lawr. nec. Gm.) Base of culminicorn broad and rounded. Frontal feathers with a slightly concave outline across culmen. Chord of culmen 4·50. Bill black; culmen and lower edges of inferior mandibular rami bright yellow.

9. D. chlororhyncha Gm. (nec. Aud. Lawr. *chrysostoma* Forst. "*profuga* Banks;" "*presaga* Brandt.") Base of culminicorn tapering to an acute angle. Frontal feathers straight or with slight convexity across culmen: thence downwards with some forward obliquity, and slight convexity of outline, forming a sharp reëntrant angle at upper corner of base of latericorn. Chord of culmen 4·50. Bill black. Culmen, and a narrow perpendicular line along the sides of the base of the under mandible, bright yellow.

10. D. olivaceirostris Gould. Bill slender, uniform olive green, three and three-eighths long from gape to tip.

Genus II. Phœbetria Reich. Bill excessively compressed. A sulcus on sides of lower mandible. Feathers forming a deep reëntrant angle on culmen; an acute salient on one side of lower mandible. Nostrils very narrow. Tail elongated, cuneate.

11. P. fuliginosa Reich. ex *Diomedea fuliginosa* Gm. (*antarctica* Banks; *palpebrata* Forst.; *fusca* Aud.) Height of bill at base 1·50, width ·75. The culmen is carinated for its basal half.

Sub-family *HALODROMINÆ*.

Some general remarks upon the fundamental characters of this interesting group have already been given at the head of the present article. We may at once proceed to the consideration of the single genus by which it is represented.

Genus PELECANOIDES Lacép.

Procellaria sp. Gmelin et auct. aliq.
Pelecanoides, Lacépède, Mem. de l'Inst. 1800–1, p. 517. Typus *Proc. urinatrix* Gm.
Haladroma, Illiger, Prodromus, 1811, p. 273. Typus idem.
Onocralus, Rafinesque, 1815; fide Bon.
Puffinuria, Lesson, Man. 1828, ii, p. 392: Id. Traité Ornith. 1831, p. 614. Typus *P. Garnoti* Less.

Concerning these numerous names which have been proposed for this genus

[May,

the preponderance of authority is in favor of the adoption of that of Illiger. I can, however, discern no cause why Lacépède's name should be superseded. The reasons given by Illiger, in proposing *Haladroma*, and by Lesson in founding *Puffinuria*, certainly seem invalid. To G. R. Gray is, I believe, due the credit of restoring the rightful appellation of Lacépède.

The type which represents the genus, although so curiously anomalous, is so well known, that a detailed description would be out of place here. Only a few of its more salient points need be noticed.

The perfectly vertical nostrils are surrounded by an elevated wall, whose contour, in consequence of a slight emargination posteriorly, and a corresponding protuberance anteriorly, on the median line, is somewhat cordiform. The wall has considerable thickness basally; but much bevelling superiorly gives it an extremely thin edge. The internasal septum is moderately thick; and from either side a process projects transversely into the nasal orifice. In shape each nostril is suboval; being somewhat elongated anteriorly, and a straightening of its inner border being produced by their mutual apposition.

The dertrum or unguis is long, reaching quite to the nostrils; and, for this family, is only moderately uncinated. Except at its extreme base it is distinctly carinated, and its sides are much compressed.

The myxa is unusually small and narrow, with a very acute tip, and extremely concave gonys. The sulci separating the myxotheca from the rest of the mandible, and the lateral one on the gnathidia are strongly marked.

The unusual amount of divarication of the concavo-convex gnathidia, which causes so wide a submentum, is, in the upper mandible, accompanied by a corresponding dilation of the lateral elements; which latter are also turgid and inflated.

The tarsus is excessively compressed, and at the same time very deep antero-posteriorly; giving to its transverse section a narrowly elliptical shape, like that which obtains in the *Colymbidæ*. It is reticulated as in the *Procellaridæ*, and also the majority of the *Alcidæ*, though *Mergulus* has anteriorly transverse imbricated scales. The proportions of the anterior toes are as in the other *Procellariidæ*.

In the wings and tail the urinatorial aspect is most decidedly marked. The very short wings, with their stiff, falcate, subacuminate primaries hardly reach to the end of the exceedingly abbreviated tail.

The plumage is essentially diverse from that of any other Procellaridian, in its compact imbrication, and oily glossiness, which comes nearest to that of the Loons; and is eminently adapted to resist the action of the water in which the habits of this species cause them so constantly to be submerged.

Concerning the number of species to be enumerated authors are greatly at variance. To a comparatively recent date but a single one was supposed to exist. M. Temminck, in figuring the type of MM. Quoy and Gaimard's *P. Berardii*, is of opinion that both *urinatrix* and *Garnoti* should be referred to it. M. Lesson, after describing *Puffinuria Garnoti* in 1826, doubtfully refers it to *Proc. urinatrix* Gm.* Prince Bonaparte unites *Garnoti* and *urinatrix*, and considers *Berardii* as distinct. Mr. G. R. Gray, and more recently, Dr. H. Schlegel, agree in regarding all three of the supposed species as valid. A sufficient amount of material is not at my disposal to settle these doubtful points. In a considerable number of specimens from various localities I can see what has been called *P. Berardi*, differing in some respects from the ordinary type: but have failed to detect tangible differences indicating three species. Very possibly, however, none of the specimens before me indicate the true *urinatrix*, as distinguished from *Garnoti*.

The three supposed species are based entirely upon size: a varying degree of length or robustness of bill: and coloration of the feet. Some specimens

* Traite d'Ornith. 1831, p. 720, No. 144.

before me are larger than is indicated by Dr. Schlegel as characteristic of *Garnoti:* while the feet are colored as in the smallest species, *Berardii.* A considerable amount of variation is found in examples of undoubtedly the same species; so that perhaps we might without great violence consider the different species as extremes of a single very variable type.

I am mainly indebted to Dr. Schlegel's excellent article for characters whereby to tabulate the supposed species with their synonyms. This author has had before him examples which he has considered as indicative of three species: and for the present I rely upon his judgment.

1. Pelecanoides Garnoti Gray ex Lesson.

Puffinuria Garnoti, Lesson, Voy. de la Coq. i. part ii. 1826, pl. 46.—(Bill and feet black. Length 8½; extent 16; bill 1 2-12ths; wing 5; feet and tail each 1½.)—Id. Man. Orn. 1828, ii. p. 394.—Id. Traité d'Orn. 1831, p. 730. (Queries *urinatrix* Gm. as syn.)

Pelecanoides Garnoti, Gray, Gen. Birds, iii. 1849, p. 646.

Haladroma Garnoti, Schlegel, Mon. *Proc.* Mus. Pays-Bas, p. 37.

Haladroma urinatrix, Bonaparte, C. A. 1856, ii. p. 206. (Excl. syn. Nec Gm. fide Schlegel, who has examined Bonaparte's types.)

Habitat.—West Coast of South America.

Ch. Largest; 8 to 8½ in length. Bill slender and elongated; black; along culmen ·75; height at end of nasal case ·25. Width near the base ·33. Tarsus blackish, 13 to 14 lines long; middle toe about one inch.

2. Pelecanoides urinatrix Lacép. ex Gm.

Procellaria urinatrix, Gmelin, S. N. 1788, i. part ii. p. 560, and of authors; not *Hal. urin.* of Bp.

Pelecanoides urinatrix, Lacép. et Cuv. Gray, Gen. Birds, iii. 1849, p. 646.

Haladroma urinatrix, Illiger, Prod. 1811, p. 274. Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 37.

Puffinuria urinatrix, Gould, B. Aust. pl. 60.

Haladroma Berardii, Bonap. C. A. 1856, ii. p. 206; Excl. syn. (fide Schlegel; from examination of Bp's types.)

Procellaria tridactyla, Forst. Descr. Anim. Ed. Licht. 1844, p. 1849.

Habitat.—Australian Seas.

Chs. Of medium size; feet bluish; bill robust. Wing 4·50; tail 1·40. Bill ·66; its height or width ·33; tarsus one inch. Middle toe eleven lines.

3. Pelecanoides Berardii Q. and G.

Pelecanoides Berardii, Quoy and Gaim. Voy. Uranie, pl. 37. Temminck, Pl. Col. No. 517. Gray, Gen. Birds, 1849, iii. p. 646.

Haladroma Berardii, Schlegel, Mon. *Proc.* Mus. Pays-Bas, 1863, p. 38; not of Bonaparte.

Habitat.—Southern Oceans.

Chs. Smallest; bill short, intermediate in robustness between that of the two foregoing; feet light colored, their membranes black. Length 7 inches; wing 4·40; tail 1·50. Bill ·55, its height or width about ·30. Tarsus ·80; middle toe ·90.

It will be observed that the differences between the size of the smallest and largest of these supposed species is not great; that an intermediate form occurs between the two extremes; that each is liable to considerable variations in size; and that the colors of the plumage of all three are identical.

Recapitulation.

The following is a summary of the genera and species of *Procellariidæ* treated of in the series of papers of which the present article is conclusive. The numbers in the third column are those of species which I have recognized, but which seem to require confirmation before their claims to validity can be considered as fully established. It will be seen that more or less of doubt attaches to 17 out of the 92 described.

	Genera.	Species.	Doubtful Species.
Procellariinæ			
Fulmareæ	3	6	
Æstrelateæ	3	23	6†
Prioneæ	3	6	1‡
Procellarieæ	7	21	5‖
Puffineæ	5*	21	1§
Diomedeinæ	2	12	2¶
Halodrominæ	1	3	2**
Total	24	92	17

Note. The following supposed species are not given in the body of my papers; and I only know of them by the descriptions.

Puffinus Rollandii Quoy and Gaimard, in Freynete, Voy. Antour du Monde; and Zool. Journ. iii. p. 271.

Procellaria lugubris, Tschudi, Cab. Journ. f. Ornith. 1856, iv. p. 185, (not of Natterer.) "The whole body is dark brown; the back somewhat deeper colored than the belly; the tail wholly black; the inner side of the wing darker than the outer. Bill and feet reddish; iris ashy gray. Surpasses in size *capensis;* also compressed in form. The description of *P. antarctica* is too inaccurate to say with certainty if it be the species here described. Between 46° and 36°." (*Tschudi*, ut suprà.) It is impossible to say from the description what species of *Nectris* or *Pterodroma* this is.

Procellaria maculata, loc. cit. "Island of Juan Fernandez; 33° S. Head, breast and belly wholly white; the back bluish-white with darker spots, the wings gray with bluish spots, the tips of the four longest primaries wholly black. Tail fan-shaped, grayish blue. Bill and feet deep orange yellow. Iris dark brown. About the size of the preceding species." Evidently an *Æstrelata;* but the description applies to no species with which I am acquainted. It comes nearest to *alba* Lath, or *Lessonii* Garnot.

Procellaria bicolor, op. cit. p. 187. "Bill and feet black; neck, back, and lesser wing coverts deep blackish gray, wing feathers and tail somewhat lighter. Head and throat wholly black; belly pure white." Doubtless a young *Æstrelata;* but of what species the description gives no hint.

SUPPLEMENT.

Some few additions to, and corrections of my previous papers, which subsequent investigation has brought to my knowledge, may with propriety be inserted here.

Procellarieæ.

P. 79, line 25, for "size" read "length." *H. microsoma* is rather smaller than *P. pelagica* in actual size of body, though the length of wings and tail is not less. This explains an apparent descrepancy in my statements on p. 79 and p. 90.

* I would now unite *Thiellus* and *Nectris* with *Puffinus*, leaving but three genera to be recognized.

† These six are *Bulweria Macgillivragi* and *Procellaria Parkinsoni*, Gray; *P. neglecta and P. incerta* Schl.; *Æstreiata grisea* and *Æ. gavia* of my paper.

‡ *Prion brevirostris* Gould.

‖ Which are *P. tethys* Bp., *P. lugubris* Natterer, *P. melitensis* Schembri; *Thalassidroma Segethi* Ph. and Ldbk.; *Fregetta Lawrencii* Bp.

§ *P. sericeus* Less.

¶ *D. gibbosa* Gould, which may be *nigripes* Aud., and my *D. leptorhyncha.*

** As just stated, the three recognized species of *Pelecanoides* require additional evidence to prove conclusively that they are not merely the extremes of a single variable species.

Pp. 80, 81, 90. There can be no doubt of the propriety of referring *P. lugubris* Natterer, and *P. melitensis* Schembri, to *pelagica* L. *Proc. tethys* Bp., also seems hardly distinct.

Pp. 81, 90. *Thalassidroma fasciolata* Tschudi has been recognized by other writers as valid.

Pp. 84, 91. *Oceanites segethi* ex Ph. et Ldbk. is undoubtedly a synonym of *O. gracilis* ex Elliot, as intimated in my paper.

Pp. 87, 91. *Fregetta Lawrencii* Bp. is probably a synonym of *grallaria* Bp. ex Vieill. as Mr. Lawrence himself originally believed. The point cannot now, however, be positively determined, as the specimen is lost.

Pp. 88. 91. Bonaparte's identification of Linnæus' *Proc. fregata*, which I followed, is by no means proven; and in view of the uncertainty attaching to Linnæus' diagnosis (which may refer to some species of the genus *Fregetta*) it may be as well to take our specific name from Latham's unequivocal indication of *P. marina;* calling the species *Pelagodroma marina* after Reichenbach.

Puffineæ.

Pp. 122, 142, 143. Genera "*Thiellus*" and "*Nectris.*" The points in which these groups differ from *Puffinus* proper, are exceedingly trivial. as I state in my paper. I am now indisposed to retain them, even on the plea of utility, and would accordingly unite all their species under *Puffinus.*

Pp. 119, 141. *Adamastor* Bp. According to Mr. G. R. Gray the type of the genus *Priofinus* of Hombron and Jacquinot is based upon the bird Bonaparte calls *Adam. typus*, and it has priority over Bonaparte's designation. If this be the case the three species should stand as *Priof. cinereus*, *Priof. gelidus* and *Priof. sericeus.*

Pp. 118, 141. *Majaqueus* Reich. If *Proc. Parkinsoni* Gray, (Ibis 1864) is a valid species, it may belong to this genus rather than to the fuliginous group of *Æstrelata* under which I have considered it. Additional data concerning it are greatly to be desired.

P. 121. Add *Daption gelidum* Steph. Shaw's Gen. Zool. xiii. p. 245, to synonyms of *Adamastor gelidus.*

P. 123. *Puffinus fuliginosus.* I have received specimens from the Pacific coast of North America which I cannot distinguish from the common Atlantic bird. It is quite different from the species I have named *Puffinus amaurisoma*, p. 124. By a misapprehension of a remark of Dr. Kuhl, I erroneously state that *fuliginosa* Forst., Descr. sp. 18, is a species of *Nectris;* whereas I am now satisfied it is the same as Kuhl's sp. 12, which is the *Pterodroma atlantica* of Bonaparte. Compare my remarks under *Æstrelata fuliginosa* in part iv. of these papers. Kuhl's *fuliginosa* sp. 27, after Banks' tab. 23, is identified by Mr. Gray with *pacifica* Lath.

P. 126. *N. carneipes.* On the authority of Dr. Schlegel I placed *cinereus* juv. Smith, and *gama* Bp. as synonyms of this species. Mr. Gray considers them as referring to a species of *Nectris* or rather *Puffinus* not recognized in my paper, viz.: *P. tristis* Forst. I am entirely unacquainted with this bird. if it be a valid species. Bonaparte and Schlegel make it the same as *tenuirostris* Temm.

Pp. 131, 144. A second specimen of *Puffinus creatopus* has been received from the same locality.

Pp. 141, 144. *Procellaria nugax* Sol. This unpublished specific name should not take precedence over *assimilis* of Gould.

Fulmareæ.

Add *Fulmarus antarcticus* Steph. Shaw's Gen. Zool. 1825, xiii. p. 236, to the synomyms of *Thalassoica glacialoides.*

Add *Daption antarcticum* op. cit. p. 242, to synonyms of *Thalassoica antarctica.*

[May,

Bibliographical Appendix.

It may be well to give in this connection a synopsis of the works of some of the older authors, as far as they relate to the subject in hand. The earlier authorities to be particularly consulted in a study of the *Procellariidæ** are the following:—

Linnæus, *Syst. Nat. ed.* 10 (1758.)

In this edition, the first in which species are presented, there are named (p. 131) three species; sc. *pelagica*, (type of genus *Procellaria*;) *æquinoctialis* and *capensis*.

Linnæus, *Syst. Nat. ed.* 12, vol. i. (1766.)

1. *Proc. pelagica*, p. 212.

2. *Proc. fregata*, p. 212. I followed Bonaparte's authority in referring this name to the species subsequently named *marina* by Latham; but there seems to be nothing in the Linnæan diagnosis requiring this identification; the name being very probably based upon some species of the genus *Fregetta* as now restricted.

3. *Proc. glacialis*, p. 213, = *Fulmarus glacialis* Leach.

4. *Proc. æquinoctialis*, p. 213, = *Majaqueus æquinoctialis* Reich.

5. *Proc. capensis*, p. 213, = *Daption capensis* Steph.

6. *Proc. puffinus*, p. 213,= probably *P. anglorum* (Ray,) Temm. Has been identified also with *P. Kuhlii* Boie, and *P. major* Fab., and almost every other Atlantic *Puffinus*.

Gmelin, *ed. Linn. Syst. Nat.* vol. i. part. ii. (1788.)

7. *Proc. obscura*, p. 559. One of the smaller *Puffini*, the habitat of which is given as "insula nativitatis Christi." Now universally applied to the common bird of the Atlantic, called *obscura* by Vieillot, Nouv. Dict. p. 423, in 1817.

8. *Proc. pacifica*, p. 560. Not identified with any other known species. A large *Puffinus*, from the island of Euopoa.

9. *Proc. cœrulea*, p. 560, = *Halobæna cœrulea* Bp.

10. *Proc. vittatus*, p. 560, = *Prion vittata* Lacép.

11. *Proc. urinatrix*, p. 560, = *Pelecanoides urinatrix* Lacép.

1. *Proc. pelagica*, p. 561. Variety B. is probably fictitious.

2. *Proc. fregata*, p. 561. Same as that of Linnæus.

12. *Proc. furcata*, p. 561, = *Oceanodroma furcata* Reich.

13. *Proc. fuliginosa*, p. 562. Based upon Latham's species of this name, and not yet identified. A small species, eleven inches long, with a forked tail; from Otaheite. Generally supposed to be a species of *Thalassidroma*.

14. *Proc. desolata*, p. 562. Now recognized as a valid species of *Æstrelata*.

15. *Proc. nivea*, p. 562, = *Pagodroma nivea* Bp.

16. *Proc. melanopus*, p. 562. Not identifiable, except opinionatively. Evidently some species of *Æstrelata*. Said to come from North America, which would make it referrible to *Æ. hæsitata*. Description applies in most respects to *mollis* Gould.

3. *Proc. glacialis*, p. 562, = *Fulmarus glacialis* Leach. The var. B. is the *Thalassoica glacialoides* (Smith) Reich.

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*The indications of the *Diomedeinæ* are generally so definite that the consideration of them may be here omitted.

17. *Proc. cinerea*, p. 563. A stumbling block, concerning which authors are greatly at variance. Usually employed by European authors as the name of the species I describe as *Puffinus Kuhlii* Boie ; and applied by American writers to *P. major* Fab. By Bonaparte identified with his *Adamastor typus* (= *hæsitata* Forst. Gould, Reich. nec Kuhl, Temm. = *Adamastor cinereus* of my paper,) in which opinion I entirely concur. According to Mr. Gray, the genus *Priofinus* Homb. et Jacq. is based upon this same bird, and antedates *Adamastor* of Bonaparte. The proper name of the species in question would then be *Priofinus cinereus.*

18. *Proc. gigantea*, p. 563, = *Ossifraga gigantea* Reich.

19. *Proc. brasiliana* p. 564. Very dubious. May be the same as the preceding species ; or the *Graculus brasilianus*, as identified by Bonaparte.

4. *Proc. æquinoctialis*, p. 564, and var. B., = *Majaqueus æquinoctialis* Reich.

20. *Proc. grisea*, p. 564. Unidentifiable.

21. *Proc. gelida*, p. 564. I think that this name was based upon the species subsequently named *flavirostris* by Mr. Gould, the proper name of which appears to be *Priofinus gelidus.*

22. *Proc. alba*, p. 565. Evidently a species of *Æstrelata*, and probably some one of the plumages of *Æ. Lessoni.*

LATHAM, *Index Ornithologicus*, ii. (1790.)

Of Dr. Latham's three principal works this is the one usually referred to, as being the only one in which Latin binomial names are used. Most of the species given in this work have exactly the same import as those of Gmelin, and need not therefore be noticed. The following are the chief points requiring attention :—

6. *Proc. alba*, var. B., p. 822.—"Norfolk Island Petrel." A species subsequently named *Proc. Phillippi* by Gray, with which *P. mollis* Gould is considered as probably synonymous.

18. *Proc. marina*, p. 826.—First definite characterization of the type of the genus *Pelagodroma* (*Pel. fregata* Bp. *Pel. marina*, Reich.)

21. *Proc. Forsteri*, p. 827, = *Proc. vittata* Gm.

23. *Proc. pacifica* p. 827. Same as that of Gmelin. The name is unidentifiable, unless we regard it as expressive of a valid species. By Mr. Gray it is so considered (Cat. Birds Pac. Isl.) and the following cited as synonymous : *Nectris fuliginosus* (Sol.) Banks, ic. 23.—*Proc. fuliginosa* Kuhl, sp. 27 ; (but *not* Kuhl's sp. 12 !) *Puff. pacificus* Gray, Gen. Birds, p. 647. It is a large *Puffinus*, 22 inches long, with flesh-colored bill and feet ; from Enopoa.

24. *Proc. obscura*, p. 828, = that of Gmelin. By Mr. Gray this name is considered the same as that of Vieillot, (Nouv. Dict. xxv. p. 423, and Gal. Ois. tab. 301 ;) and is made to include the Australian form (figured by Mr. Gould, pl. 59 of the B. Aust. and named by him *assimilis*,) which is considered distinct by the majority of writers.

VIEILLOT, *Nouv. Dict. d'Hist. Nat.* XXV. (1817.)

The article "Petrel" of this work is in general a close copy of Gmelin and Latham. Certain points, however, may be noticed.

Proc. pelagica, p. 416. Mentions under this head the "Petrel échasse" of Temminck.

Proc. grallaria, Vieill. p. 418. First name of the species subsequently named *leucogaster* by Gould ; unless as is possibly the case *fregata* of Linnæus be this species rather than the *Pelagodroma marina.*

Proc. fuliginosa, p. 418. Latham's Otaheite species, whatever that may be.

Proc. grisea, p. 419. Unidentified. = that of Gm. and Lath.

Proc. alba, p. 419. Mentions under this head the "Norfolk Island Petrel," subsequently named *P. Phillippii* by G. R. Gray.

Proc. puffinus, p. 421, = *Puff. anglorum.* Cites Pl. Enl. 962. The "*Proc. puffinus* var. Lath. Pl. Enl. No. 39" may refer to *Puffinus Kuhlii* Boie.

Proc. pacifica, p. 422. "Se trouve en Europe" by error for "Euopoa."

Proc. æquinoxialis, p. 422. Refers as a variety of this species to the "Kurile Petrel" of Latham and Pennant, from Kamtschatca; a bird now generally supposed to be some species of *Nectris;* which latter identification requires confirmation.

Proc. leucorhoa, Vieill. p. 422. First designation of the *Thalassidroma Leachii* Temm.

Proc. obscura, p. 423. Is this the same as Gmelin's species? This reference to Vieillot should rather be cited for the name of the common small Atlantic *Puffinus.*

HEINRICH KUHL, *Beit. Zool. u. Vergl. Anat.* (1820.)

In this work there is presented a "Beiträge zur Kenntniss der Procellariden" which is a very important contribution to the bibliography of the family, marking perhaps the first decided advance over the writers of the eighteenth century. The following species are given in this monograph:

1. *Proc. furcata* "L." p. 136. = *Oceanodroma furcata* Reich.

2. *Proc. oceanica* "Banks," p. 136. = *Thalassidroma Wilsoni* (*P. pelagica* Wils.) of most ornithologists, now *Oceanites oceanica* mihi.

3. *Proc. marina* "Lath." p. 137. = *Pelagodroma fregata* Bp. and of my paper; *Pelag. marina* Reich.

4. *Proc. Leachii* "Temm." p. 137. = *P. leucorrhoa* Vieill. = *Cymochorea leucorrhoa* Coues.

5. *Proc. fregatta* "Banks," p. 138. = *P. grallaria* Vieill. nec Licht, (= *leucogaster* Gould.)

6. *Proc. pelagina*, p. 139. = *P. pelagica* Linn.

7. *Proc. glacialis*, p. 139. = *Fulmarus glacialis* Leach.

8. *Proc. capensis*, p. 140. = *Daption capensis* Steph.

9. *Proc. gigantea*, p. 140. = *Ossifraga gigantea* Reich.

10. *Proc. æquinoctialis*, p. 141. = *Majaqueus æquinoctialis* Reich.

11. *Proc. hasitata* "Forst." p. 142. But not of Forster. Kuhl's *hasitata* is the same as that of Temminck, Pl. Col. 416, which is an *Æstrelata.* (*Æst. diabolica* Bp. = *Æst. hæsitata* of my paper.)

12. *Proc. fuliginosa*, p. 142. = *fuliginosa* Forst. nec auct. = *Proc. atlantica* Gould. = *Pterodroma atlantica* Bp. = *Æstrelata fuliginosa* Mihi.

13. *Proc. desolata*, p. 143. = *Æstrelata desolata* Bp.

14. *Proc. turtur*, "Banks," p. 143.—I prefer Mr. Gould's identification of this species to that of Dr. Schlegel. See remarks in my paper on *Prionex.*

15. *Proc. grisea* "L." (Gm.) p. 144.—Not of Gm. Lath. Examine Dr. Schlegel's identification of this species; which I follow.

16. *Proc. cærulea* "Forst." p. 145. The *cærulea* of Gmelin, which Forster calls "*similis.*"

17. *Proc. urinatrix* "Forst." p. 145. The urinatrix of Gm. now *Pelecanoides urinatrix*, which Forster calls *Proc. tridatyla.*

18. *Proc. nivea*, p. 145. = *Pagodroma nivea* Bp

19. *Proc. antarctica* p. 145. = *Thalassoica antarctica.*

20. *Proc. lugens* "Forst." p. 145. Not positively identifiable. Dr Kuhl

says that he "thinks it is *P. grisea* L." which, according to his use of this name, would make it the species described in my paper upon Dr. Schlegel's authority as *Æstrelata grisea*.

21. *Proc.* ——— "Forst. tab. 20," p. 145. An undetermined species.

22. *Proc. puffinus*, p. 146. = *Puffinus major* Fab.

23. *Proc. anglorum*, p. 146. = *Puffinus anglorum* Temm.

24. *Proc. obscurus*, p. 147. = Vieillot's species.

25. *Proc. cinerea*, "L." p. 148. Not of Linnæus or Gmelin; but the *Puffinus Kuhlii* Boie.

26. *Proc. munda* "Banks, tab. 24," p. 148. = Quid?

27. *Proc. fuliginosa* "Banks tab. 23," p. 148. Quite a different bird from Kuhl's sp. 12. Unidentifiable by the description. By G. R. Gray identified with *Proc. pacifica* Lath., whatever that species may be!

28. *Proc. vittata* p. 149. = *Prion vittatus* Lacép.

STEPHENS, *Continuation of Shaw's General Zoology*, xiii. (1825.)

This work closely adheres to Gmelin's and Latham's authority. A few points may profitably be examined.

Proc. oceanica, p. 223. Not the *Oceanites oceanica* (*Thalassidroma Wilsoni*) but a species of *Fregetta*, probably *F. grallaria*. Author refers to Forster; to Pl. Enl. 993; to Temm. Man. p. 520; and to Bp. Journ. Acad. Phila. v. iii. p. 8. On the followiug page (p. 224) "*Proc. Wilsoni*" is presented.

Puff. cinereus, p. 227. The synonyms adduced are chiefly those of *Adamastor cinereus;* description applies either to this latter or to *Puffinus Kuhlii* Boie; the description of the young would do for *Puffinus major* Fab.

Puff. æquinoctialis, p. 229. Cites *Proc. pacifica* Lath. as a queried synonym.

Puff. obscurus, p. 230, is Gmelin's species.

Genus *Fulmarus* instituted, p. 233.

Fulmarus antarcticus, Steph. p. 236, is based upon *Proc. glacialis* var. B. Lath. Ind. Orn. ii. p. 823, (= Var. A. sp. 9, p. 405, of Lath. Gen. Syn.) which is the *Thalassoica glacialoides*. This synonym of the species was accidently omitted in my paper on the *Fulmareæ*, and the omission not discovered until too late.

Genus *Daption* instituted, p. 239, with *capensis* as type. The author "ventures to attach the numerous Southern Petrels described by Latham thereto," producing a heterogeneous assemblage in which figure *antarctica*, *nivea*, *desolata*, *gelida*, *grisea*, (of Linn. nec Kuhl, Schl.) *alba*, and *fuliginosa* (= Latham's Otaheité species.)

Genus *Pachyptila* "Ill." adopted; under it are arranged, besides its type *vittata* (here called "*Forsteri*") *cærulea* Gm., *marina* Lath., *fregata* Linn. and *furcata* Gm., nearly all of which are typical of distinct genera.

JOAN. REIN. FORSTER, *Descr. Anim. etc. curante* HENR. LICHTENSTEIN. (1844.)

The numerous species described and named by Forster have an important bearing upon the bibliography of the Family. It is greatly to be regretted that they were only published at a comparatively recent date: and that his figures still remain inedited. Forster appears to have had very little regard for priority in the matter of names; but his descriptions are in the main so excellent, that nearly all his species are identifiable. The following is a list of the species given by him:

Proc. capensis, p. 20.

Proc. vittata, p. 21.

Proc. fuliginosa, p. 23. = *Proc. atlantica* Gould. = *Pterodroma atlantica* Bp. = *Æstrelata fuliginosa* of my paper. Not of Gm. Lath. Vieill. Not of Strickland. Equals Kuhl's sp. 12; but not his sp. 27.

Proc. puffinus, p. 23. Not of Linn. Gm. Lath. Some large Southern *Puffinus*, possibly the true *P. major*, Fab.

Proc. glaicalis, p 25. Not of L. Gm. Lath.; but the *Thalassoica glacialoides* (Smith) Reich.

Proc. nigra, p. 26, = *æquinoctialis* L.

Proc. nivea, p. 58.

Proc. similis, p. 59. = *Halobæna cærulea*, Bp. ex Gm.

Proc. antarctica, pp. 60 and 202.

Proc. gavia, p. 148. Not subsequently identified with any known species. By Gray regarded as a valid species; and so given in these papers.

Proc. tridactyla, p. 149. = *Pelecanoides urinatrix* Lacèp. ex Gm.

Proc. fregata, p. 180. The *grallaria* of Lichtenstein; not of Vieillot. Probably the species subsequently named *melanogaster* by Gould.

Proc. inexpectata, p. 204. A somewhat doubtful species, coming nearest to *mollis* Gould, with which I have identified it.

Proc. tristis, p. 205. ("Pr. fuliginosa, rostro fusco, pedibus anticé glaucis; $17\frac{1}{2} \times 38$; bill 2; its width $\frac{1}{2}$; its depth $\frac{3}{4}$.") A southern fuliginous *Puffinus*, not identified with any known species. Mr. G. R. Gray (Ibis, 1862 p. 244) considers it as a valid species, and assigns the following synonymy: *Proc. grisea* Forst. ic. ined. 94; (nec Gm.) *Puff. major*, Gray, Ereb. and Terr. (nec Fab.) *P. fuliginosus* Homb. and Jacq. Voy. Pôle. Sud. tab. 32, fig. 7. (nec Strickl.) *Puf. cinereus* A. Smith, Ill. S. Afr. Bds. (nec Gm. nec Auct.) *Nectris gama*, Bonap.

Proc. leucocephala, p. 206. = *Proc. Lessonii* Garn. (*Æstrelata Lessoni* Cass.)

Proc. hæsitata, p. 208. = *P. cinereus*, Gm. Lath. Vieill. Lawr. = *Adamastor typus* Bp. = *Adam. ciner.* or *Priofinus ciner.* Cones. = *Proc. Adamastor* Schlegel, etc. etc. The *hæsitata* of Gould and Reichenbach, but not of Kuhl and Temminck, which is an *Æstrelata*.

Proc. ossifraga, p. 343. = *gigantea* Gm.

In bringing to a close the present series of papers, the author is deeply sensible of their many defects; and can only crave for them a lenient judgment in view of the very difficult nature of the task he attempted, and has throughout conducted, with the sole desire of elucidating truth. Should the undertaking prove a failure, and the meagre results incommensurate with the time and labor bestowed,—at least it may be said of him, "—— si non tenuit, magnis tamen excidit ausis."

with the Author's Compliments

[*From* The Ibis, *July* 1866.]

FROM ARIZONA TO THE PACIFIC.

By ELLIOTT COUES, M.A., M.D.

The month spent in slowly passing over the five hundred miles that lie between Fort Whipple, in Arizona, and the coast of Southern California at San Pedro, afforded me a fine opportunity of comparing the *Ornis* of the two regions, which, though possessing much in common, are yet in many points strikingly contrasted with each other. A running commentary upon the more marked ornithological features of the regions traversed may be of interest; albeit the remarks that follow are little more than a collection of the heterogeneous and disjointed notes with which a travelling naturalist's journal is always found crammed.

From Fort Whipple to Fort Mojave, the nearest point on the Colorado river, is a distance of 161 miles in a nearly straight line a little north of west. The nature of the country is such that hardly any change from the Whipple features are to be noticed until the river is nearly reached. At Beale's Springs, a point rather more than halfway, I first noticed *Pipilo aberti* and *P. mesoleucus*, two species abundant in the Colorado valley, but never noticed at Fort Whipple, though found some twenty miles south of that place. As we approach the river, we have an unfailing sign that other species are soon to be encountered, in the increased number and variety of *Cactaceæ*, and their greater luxuriance of growth. And, sure enough, I found, on a dry barren plain covered chiefly with *Opuntiæ*, *Cerei*, and other cactuses, the rare and hardly-known *Harporhynchus lecontii*. A fine specimen, procured September 30th, 1865, is the second one known to naturalists, the type of the species (procured by my friend Dr. J. L. Leconte, at Fort Yuma, California) having remained unique up to the present time. I think it is a good species, quite distinct from *H. crissalis*, to which it is most nearly allied. Both inhabit the whole valley of the Colorado and Gila rivers, and, though thus associating, seem constantly to preserve their characters. They are shy and retiring birds, frequenting the brush and thickets which, to a greater or less extent, cover the dry plains, and keep much on the ground,

where their large, stout legs enable them to run firmly and rapidly. Their flight is swift and desultory, performed with quick, jerking motions of their wings and flirting of their long broad tails. I saw several other individuals, but was unable to procure more than one. The irides were brown, the legs, feet, and bill black.

Fort Mojave, on the Colorado river, in about lat. 35°, is interesting to us as the locality whence were lately procured two rare and curious new birds by Dr. J. G. Cooper, so well known as an indefatigable and accurate naturalist, and by him named* *Athene whitneyi* and *Helminthophaga luciæ*. The Owl is a diminutive little species, about equal to *Glaucidium gnoma* in size, but very widely different in form. Dr. Cooper told me that he hardly thinks it is a true *Athene*, though it comes nearer to that genus than to any other North American one. I have just now carefully examined the type specimen, and find my friend's views fully confirmed. The bird is evidently generically distinct from any other North American form, and I have elsewhere so published it. The *Helminthophaga* is a queer little bird, nothing like any of its congeners in its colours, which are rather those of a *Polioptila* than a Sylvicoline, being plumbeous-grey above and white beneath, with a chestnut crown and rump. I had myself rediscovered it during my stay at Whipple, and obtained several specimens, among which was a fledgling just from the nest, which differed notably in colour from the adult, wanting the chestnut crown—though the rump was of that colour—and having the wing-coverts edged and tipped with very light rufous. Both of us have very full notes of the habits of this interesting little bird.

While at Fort Mojave I gladly availed myself of a kind invitation from the Commanding-General of the Territory to accompany him on a *pasear* down the Colorado river, as far as Fort Yuma. This gave me exactly the opportunity I had been desiring, of adding to my list the many water-birds to be found in the Colorado basin. The month of September was consumed in passing down the river to the point where the Gila mingles its waters with those of the larger stream, which is the extreme

* Proc. Californ. Nat. Hist. Soc. 1861, pp. 118 and 120.

south-west corner of Arizona, and in returning after a few days spent at Fort Yuma. We were on the little steamer 'Cocopah;' and by a singular coincidence her commander, Captain Robinson, was the man who twelve years before had piloted Lieutenant J. C. Ives and his party in the 'Explorer,' the first steamboat that ever passed over the shores and rapids of this difficult river.

Sayornis nigricans, a common species throughout Southern Arizona, was perhaps, among the land birds, our most constant companion. Perched, generally in pairs, upon the dense verdure that in many places overhangs the river, it pursued its constant vocation of securing the vagrant insects around it, ever uttering its peculiar unmelodious notes. In all its motions the Pewee of the Eastern States was unmistakeably reproduced. It was, for a Flycather, rather shy and wary, which fact, joined with the almost impassable nature of the thickets, is my only and lame excuse for its absence from my collection. It is not, apparently, a hardy bird, and I never saw it, even in summer, about the Whipple mountains, though in the southern portions, both of Arizona and California, it remains throughout the winter. River-bottoms are but one of its resorts. Like *S. fuscus*, and extremely unlike *S. sayus*, it also delights in deep mountain-gorges and precipitous *cañons*, through which little streams may flow, where upon a jutting bit of rock, or on the bare, flat sand, it unites its sharp cries with the queer ringing laugh trilled out by its neighbour and friend the little *Catherpes mexicanus*.

Often when breaking a toilsome way through next to impassable thickets, I was startled by a loud, clear, sharp chirp, decidedly Fringilline, but far more powerful than usual. It was the alarm-note of *Pipilo aberti*, which everywhere in the valley is a most characteristic bird. Fort Yuma seemed to be its headquarters. A retiring species, like all its congeners, it keeps perseveringly in the most provoking undergrowth, and would rarely find its way into collections were it not so common. It seems to me more decidedly gregarious than most of the genus, often collecting in flocks of a dozen or more, wandering restlessly, yet in a cautious and subdued manner, through the thickets. Associating freely with this species is

another, *P. mesoleucus*, which is little less numerous, and to which my remarks upon *P. aberti* equally apply, except perhaps that it has a less powerful note. During the long moult, which lasts from July far into October, both these birds suffer much, and are in such wretched plumage as to be hardly worth preserving.

At Fort Yuma, in September, I was in time to catch *Helminthophaga celata* on its southward journey. It was not very rare, frequenting low trees, young willows and the like, as well as brush-heaps and thickets; I think that it is much less a tree-species than are its Eastern congeners, and that it approaches *Geothlypis* in its habits. At this season the head is perfectly plain, and the bird looks very much like an autumnal *Dendræca striata*. It is partially gregarous at this season, and its only note is a low, sharp "t'sip."

All along the Colorado valley *Lophortyx gambeli* is singularly abundant. This is a very easily pleased bird, and one by no means fastidious in choice of a residence; for it is equally at home in scorched mezquite-thickets, dusting itself in sand that would blister the naked feet (for the thermometer stood 117° Fahr. in the shade while I was at Yuma!), and in the mountains of Northern Arizona, where pine-boughs are bending under a weight of snow. I have already enlarged on the habits of this bird [*anteà*, pp. 46–55], but I may now add that my friend Dr. Cooper, while at Mojave, brought up young birds by placing the eggs under a common hen, and that he found no difficulty in semidomesticating them as they grew up, to the extent of their associating freely with the barnyard fowls. The eggs, which are white or yellowish-white, with brown spots, were hatched in twenty-four days. From twelve to seventeen have been found in a nest, which latter is a rather rude structure, about eight inches wide, hidden in the grass.

One of the features of the scenery of Yuma is a bird known as the "Colorado Turkey." As the order to which it belongs could never be guessed from this name, I must explain that it is the *Tantalus loculator* of Linnæus, though why called a "Turkey" I know not. These birds are in sight at all times, flying over head with outstretched necks, uttering their rough

cries, or statelily promenading the banks of the little lagunas and sequestered pools that fill the river-bottom. Unlike most large *Grallæ*, they do not much affect the open sandbars or even the mud-flats of the river itself, but fairly deserve their common name of "Wood-Ibis," by their partiality for densely wooded pools and swamps. They have also a peculiar habit of congregating in large numbers high up in the air, where with scarcely any visible motion of their broad wings they circle in majestic sweeps. Their pure white plumage and glossy greenish-black wing-tips form a superb contrast; and their beauty renders more ugly by comparison the dull sombre hues of the Turkey-Buzzards, with which at such times they freely associate—though the Vulture and the Wader may vie with each other in ease and elegance of flight, each sailing and circling with that "poetry of motion" which only some longipennine *Natatores* can surpass.

Here is a simple list of some other water-birds of the river, named somewhat in their order of abundance. Such familiar friends will be recognized in all of them, that I need do no more than mention their names. *Ardea herodias, Grus canadensis, Garzetta candidissima, Herodias egretta, Butorides virescens, Recurvirostra americana, Himantopus nigricollis, Botaurus lentiginosus, Ardetta exilis, Nyctiardea gardeni, Chroicocephalus philadelphia, Fulica americana, Pelecanus trachyrhynchus, Phalaropus wilsoni,* and *Podilymbus podiceps.*

I saw many Ducks, but only identified three species—*Dafila acuta, Nettion carolinensis,* and *Querquedula cyanoptera.* It was a little too early in the season for the immense flights of Geese and Ducks which a little later would cover the water. For the first time in my life, I saw our two North American Kingfishers (*Ceryle alcyon* and *C. americana*) together; I believe the latter has not been before recorded from the Colorado river. It is surprising that I did not meet with *Auriparus flaviceps,* since, as Dr. Cooper informs me, it is abundant at Fort Mojave and elsewhere in the valley. *Melospiza fallax* (at best doubtfully distinct from *M. melodia*) is a common Sparrow here.

Before we finally bid good-bye to the river I must advert to the immense numbers of *Hirundo lunifrons* that make its sometimes precipitous and rocky sides their breeding-places. So

numerous are the nests at some points, that one spot has received and still bears the name of "Swallow-nest Bend;" and not unfrequently in the midst of the colony of Swallows is placed the rude nest of *Ardea herodias*, flat upon some projecting ledge of rock.

Leaving Fort Mojave, which I did on the 30th of October, before us to the westward lies the Colorado desert—a barren waste of sand and rock which stretches everywhere between the river and the fertile and habitable portions of Southern California. It would be difficult to imagine a region more uninviting or more devoid of varied forms of animal life. It would be a profitless tract for an ornithologist expecting to find variety, though still the few species found are interesting. For whole days hardly more than the Ravens would relieve the monotony of wearisome travel. I cannot forbear to quote from my friend Dr. Newberry, who must have written under the inspiration of the surrounding desolation. "Even on the most sterile and inhospitable portions of the central desert, where heaven withholds her genial showers and earth refuses every tribute to beauty or comfort; where stern and unrelenting sterility reigns supreme and barren sands and rough and ragged rocks, bleached and burnt in the eternal blaze of a cloudless sun, sear the eyeball; here, perched on some blasted pine, the presiding genius of the surrounding desolation, the Raven always sat, and as we defiled past, over the trackless waste, gave us the malediction of his discordant croak." Except the ubiquitous and omnipresent Ravens and an occasional *Anthus ludovicianus*, hardly a bird was seen* for some days after leaving the Colorado, until, crossing the Providence Mountains, we encamped at Soda Lake, the "Sink" of the Mojave river, which, rising in the San Bernadino Mountains of California and flowing in an easterly direction towards the Colorado, is stopped by the Providence Mountains, and quietly sinks in the sand of the desert. Its bed is usually nearly or quite dry, except in spots, for many miles from its sink, and

* Dr. Cooper tells me that on this portion of the route he met with *Poospiza bilineata*, *P. belli*, and *Campylorhynchus brunneicapillus*. The latter, he says, is emphatically and almost exclusively a Cactus-Wren, always found among, and breeding in, plants of this family.

forms the most convenient and perhaps the only practicable route from this portion of Arizona into California. Soda "Lake" is, except at times, even less of a lake than the Mojave is of river, being merely a flat muddy expanse, where the ground for miles is white as snow from the thick deposit of saline efflorescence, whence the spot derives its name. A more desolate and forlorn spot can hardly be conceived; but to an ornithologist it has attractions.

It has been ascertained that just here *Lophortyx gambeli* and *L. californica* find a neutral ground that they both may occupy. Doubtless the western species follows the watercourse until arrested by the desert: I have never heard of its being detected in the Colorado valley, where *L. gambeli* holds undisputed possession; and I think it is exceedingly probable that the representative Jays of the two countries (*Cyanocitta woodhousii* and *C. californica*) may also both be found here; and perhaps the same fact may hold good regarding some other species. Near the sink of the river, Dr. Cooper found *Centrocercus urophasianus*, which I believe is the most southern point at which it has been discovered. I never saw one, nor, indeed, any other species of Grouse, while in Arizona. The same gentleman ascertained the presence of *Trochilus alexandri* on the river. In the heavy rushes that formed clumps of various sizes I heard the loud clatter of *Rallus virginianus*; and happening to be kept awake all night by the unendurable torture of hosts of hungry mosquitoes of a peculiarly large and vindictive species, I am able to state that the Rail emits its unmusical noise as often during the night as the day. Numbers of *Cistothorus palustris* and a few Mallards finish the list of birds observed here.

Towards the head of the river, where the water became permanent, were immense quantities of Geese and Ducks. I pass them over now, as in no way differing from those found at San Pedro, of which I will speak presently.

With the first appearance of anything like verdure, I found myself again among Field-Larks. Arizona is most unaccountably deprived, in a great measure, of these birds; I do not think I saw a dozen during my whole stay there, though many places seem perfectly adapted to their wants. *Gallinago wilsoni*

is found in the moist meadows, and over the marshy tracts of the river the common *Circus hudsonius* may always be seen.

Leaving the Mojave at Lane's Crossing, we in one day got through the Cajou Pass of the San Bernadino Mountains. This pass is about the most eastern recorded locality for the beautiful *Oreortyx pictus*; and, regarding the other Quail of California, *Lophortyx californicus*, we need here have no fear that we shall ever be puzzled with a supposed hybrid between it and *L. gambeli*; for no suspicion of the latter's presence here is to be entertained. *Oreortyx* and *Lophortyx* are so radically distinct in the nature of the localities they frequent, as to be distinguished by the people as the "Mountain" and "Valley" Quail.

Behind San Bernadino and the coast lies about eighty-five miles of plain, open and flat, though by no means desert and sterile, the continuity of which is hardly interrupted. Besides the constant features of such plains—*Eremophila cornuta* and *Anthus ludovicianus*—we find two very interesting birds in considerable numbers. One of these is *Athene cunicularia*, which I supposed to replace *A. hypogæa* in the regions west of the Rocky Mountains. I must confess I have my doubts regarding this strict distribution of the two, and also as to whether they are really distinct, which, however, this is not the place to discuss. The Owls are very numerous, living in the burrows of *Spermophilus beecheyi*, a Marmot-Squirrel exceedingly common in Southern California, though I saw none of its "towns" anything approaching in size those of *Cynomys ludovicianus* that I met with on the Arkansaw river. The other bird is *Ægialites montanus*, which seems to me most inaccurately named; for, on the many occasions I have met with the species, it has always been on open, dry, flat, sandy or grassy plains, and *never* on mountains. It may possibly retire to these latter to breed, but I do not think this is the case. Other naturalists support the assertion that the species is exclusively confined to the plains.

It seems, too, to have no special inclination for the vicinity of water, any more than has *Grus canadensis*, or, I had almost said, *Eremophila cornuta*. It is a familiar and unsuspicious bird, and, when not often disturbed, admits of a very near approach, running rapidly and gracefully, with head lowered, often stop-

ping suddenly and, drawing itself up to its full height, watching the intruder with curious eye. Its voice is soft and low, and very peculiar in tone. The iris is dark brown, the legs and feet leaden-blue*.

Among the *Raptores* here at San Pedro we find *Archibuteo ferrugineus* very common. It alights freely on the ground, where I often observed it. At Fort Whipple, where it was abundant, I never saw it except upon trees; and here it may be making a virtue of necessity in thus choosing the bare plain. *Falco nigriceps* and *F. polyagrus* are more uncommon. I shot a specimen of the latter off the roof of my house; it had the eyes brown, bill horn-blue, feet and legs light leaden-blue. *Tinnunculus sparverius*, *Circus hudsonius*, and *Accipiter mexicanus* are very common indeed. Other Hawks of Southern California, near this locality, are *Buteo elegans*, *B. cooperi*, and *B. zonocercus*, all of which have been detected by the tireless industry of Dr. Cooper. The last named, an interesting new species originally described from Guatemala by Mr. Sclater (Proc. Zool. Soc. 1858, p. 130), was first obtained within the limits of the United States by Dr. Cooper; I myself rediscovered it on the Gila river in Arizona.

Agelæus tricolor is the common Blackbird of this region. Familiar, tame, and unsuspicious, flocks of thousands continually circle about our very heads, fill the streets of the little town, and blacken the housetops. I am ashamed to say how many I procured at a single discharge of my gun. I noticed that at this season the two sexes keep in a great measure in separate flocks. Of the many that I examined, not a single male was in perfect plumage. I never saw an *A. phœniceus* or *A. gubernator* among them; but great numbers of *Scolecophagus cyanocephalus* are their constant and familiar companions.

The little *Carpodacus frontalis* had been my companion from the Rio Grande to the Pacific; and here I found "Linnets," as they are called, common enough. I was somewhat surprised to find them in full plumage, singing volubly, and apparently

* This species is generically quite distinct from *Ægialites* or any other genus of *Charadridæ* with which I am acquainted. I have elsewhere instituted a genus for it.

paired. But, then, it was not so astonishing after all; for in the garden of Southern California, even in November, I plucked ripe oranges and lemons from the trees, and ate figs and olives and luscious grapes grown in the open air, while the atmosphere was balmy as a May morning at home.

To my surprise and gratification, I was here enabled to study no less than three species of the difficult group of *Passerculi*, all of which I found very abundant. *P. rostratus* kept among the thick weeds of the dry plain, being much on the ground, where it runs as easily as a *Pipilo*, and often flying up into the bushes and resting quietly so that it could be readily shot. It associates freely with both the other species; and I have seen great numbers sunning themselves and catching flies on the piles of lumber that lay on the wharf, when they were so tame that I could have struck them with an ordinary cane. *P. anthinus* seemed confined to the moist salt grass and sedgy weeds of the seashore itself. When with difficulty it was flushed, its flight was very rapid and irregular; and it would alight again almost immediately, and run with great celerity among the roots of the thick grasses. It was thus exceedingly difficult to procure. *P. alaudinus* was common two or three miles away from the coast, but on the seashore itself I never found one mixing with *P. anthinus*; it is a brush- and weed- rather than a grass-species. I found it associating with *Anthus ludovicianus* and *Zonotrichia coronata*.

Regarding the specific relations of these *Passerculi*, I may state that *P. rostratus* differs so widely as to almost merit generic distinction. Of the two others, *P. anthinus* seems tolerably distinct, in its much darker colours, bright yellow about the head, and very numerous, distinct, dark-coloured spots over nearly the whole lower parts, together with a somewhat differently shaped bill. *P. alaudinus* is much greyer and lighter-coloured generally, with a grey rather than yellow superciliary streak, and few sparsely distributed light-grey spots beneath. These points, taken into consideration with the differences of habit above noted, and the fact that, though thus found in the same localities, they constantly preserve their peculiarities, are perhaps sufficient to establish specific diversity. I must candidly confess, however, that I cannot satisfactorily

distinguish *P. alaudinus* from the common Eastern *P. savanna*. In large series of the latter, shot about Washington, I have found fully as great differences as I have ever detected in comparing the eastern with the western forms.

The preceding birds are the characteristic species of the immediate vicinity, and include perhaps a majority of the land species. I cannot better give an idea of the number, variety, and interest of the Waders and Swimmers that were all crowded into the little bay of San Pedro, which is at the mouth of the San Gabriel river, than by epitomizing a day that I spent most delightfully sailing about with Dr. Cooper, whose hospitality I enjoyed during my stay, and whose conversation was to me an encyclopædia of interesting biographies of the birds of the Pacific coast.

It was difficult navigation along the intricate channel of the bay, even for our boat which did not draw a foot of water. Most extensive mud-bars and flats were laid bare by the receding tide, all crowded with Waders. Conspicuous among them the large *Numenius longirostris* stalked with dignity about, or flew by us in flocks uttering its loud cries. Associating with each other, and with the Curlews, *Symphemia semipalmata*, *Gambetta melanoleuca*, and *Limosa fedoa* helped the Curlews to keep us from shooting any Geese by their incessant vociferations. Sprinkled among these larger Waders, immense flocks of the Pigmies, *Actodromas minutilla* and *Ereunetes pusillus*, left myriads of little tracks in the soft mud for the next tide to efface.

Standing in the shallow water, often hundreds of yards from visible land, the Herons crooked their necks and darted their bills at luckless fish—*Garzetta candidissima*, *Herodias egretta*, and, towering above them all, the great *Ardea herodias*, the latter tall enough to rear his whole neck above the tallest grass of the sedgy flats. More hidden among the grasses and reeds, numbers of Geese were feeding on succulent shoots; but they are so much annoyed that it was hard to kill them. No less than five species are to be seen—*Anser hyperboreus*, *A. gambeli*, *Bernicla hutchinsi*, *B. canadensis*, and *B. nigricans*; and I believe I have named them somewhat in the order of their abundance, though perhaps Hutchins's Goose is commoner than

the two first. But over the bay, though we saw many Ducks and Geese, they neither are so numerous as they are a little way from the sea on the lagoons and marshes of the San Gabriel river, or even (in the case of the Geese at least) on the dry bare plains. There is one exception to this, in *Pelionetta perspicillata*, which never, I believe, leaves the sea and its estuaries; they were in sight all day, rising and falling with the waves of the ocean.

On the edges of the mud-flats sat rows of black uncouth-looking birds, bolt upright, with drooping wings, apparently enjoying the sun while digesting the mass of food with which, I have no doubt, their stomachs were overloaded. Gastric activity is usually, in birds as in man, in inverse ratio to mental acuteness; and these birds allowed themselves to be shot with a nonchalance highly amusing and gratifying. *Graculus dilophus* they were, in spite of their white breasts, which only indicated that they were not yet a year old. When older they are lustrous black, but still very different from *G. penicillatus*, which, by the way, is also found here, though rather rare. They have jealous (that is, green eyes), like all Cormorants; and the brilliant orange gular pouch and sides of the bill contrast finely with their dark plumage.

Speaking of these *Totipalmi* naturally calls to mind some others of the tribe. *Pelecanus fuscus* is a constant feature of the air, land, and water of this bay. Strange-looking birds, "all bill and wings," as has been remarked of them, flapping lazily along high over head, and with a queer twisting gyration of the body, with stiffly extended wings and immoveable bill, down they splash into the water with more "vims" than one would imagine them capable of. They are concealed for a few moments in the spray they raise; when they reappear, it is to fly off if the dive has been bootless—to sit still, drain the water from the pouch, and, with a toss of the head, jerk the fish into their capacious gullets if perchance they have been successful. On the water their motions are easy gracefulness itself. Notwithstanding the bulk of their bodies, and the long head and neck to be supported, they sit on the water lightly as an egg-shell.

We see how this is accomplished if we skin one. The hypertrophy of the subcutaneous cellular tissue (which is on the lower parts an inch thick), and its connexion with the hollow bones and air-tubes of the lungs, so that they can inflate it at pleasure, makes them as light as a lifeboat. They fly by long heavy powerful beats, which alternate with short sailings. Often they do just as I have described of the Cormorants, and for precisely similar reasons. At this season (November) their necks are white, their heads and portions of the jugulum yellow. The bill is brilliant carmine or pinkish-vermilion, which, in a few hours after death, fades into reddish flesh-colour. The nail is yellowish white, with a black base; the gular pouch dirty ochraceous green. The space around the eye is pinkish flesh-colour, and the soft base of the upper mandible is black.

While *P. fuscus* was thus so common on the bay, not an individual of *P. erythorhynchus* was to be seen; but two or three miles inland, on the freshwater ponds and lagoons, they are in great plenty. And in these lagoons, with the White Pelicans, let me mention, by the way, that *Macrorhamphus scolopaceus* is very common. It does not seem to go on to the salt-flats at all. I believe its habits are very similar to those of *Micropalama himantopus*. The species is one that is rather snubbed by American ornithologists, and has hardly found a champion to vindicate its distinctness from *M. griseus*, except Mr. Lawrence. Neither Dr. Cooper nor I have any doubt of its validity as a species.

Being on a sea coast, of course we anticipated *Laridæ* of several sorts. Nor were we disappointed. Foremost among the larger species stands "the Gull" *par excellence* of the Pacific coast, *L. occidentalis*, so well marked by its huge bill and dark mantle. It is a singular fact that, contrary to the law so generally prevailing among *Lari*, this bird does not, in winter, have the occiput and nape streaked with grey. I do not say this is never the case; but of hundreds (perfect adults) that I have closely examined—for it is not a shy species—not one had any trace of grey, but the parts were as pure white as in summer. At the same time all the other Gulls were thus marked. Probably the next common species was *Larus delawarensis*; and

after that come *L. californicus* and *L. smithsonianus*. The latter, first brought, I believe, from the Pacific coast by the United States' Exploring Expedition under Commodore Wilkes, is now recognized as a regular inhabitant of that region. *Blasipus heermanni* was common, as usual assiduously devoted in his attentions to the Pelicans.

Connecting the Gulls with the Terns, came the little *Chroicocephalus philadelphia*, everywhere so abundant, and here one of the most common of the longipennines. Terns of several species were dashing about over our heads; I could identify positively only *Thalasseus regius*. But I think I also saw *Sterna acuflavida*, which has not, to my knowledge, been as yet recorded from the Pacific coast of North America, though Mr. Salvin has it from Pacific Central America. A small Tern, not very common, was in all probability *S. forsteri*; and here I must make the passing remark that the more I see of the immature stages of this changeable species, the more thoroughly I am convinced that *Sterna havelli* is not a valid species.

Our generally received impression regarding the Loons and Grebes is that they are exceedingly difficult to shoot, in consequence of their wariness joined to unparalleled powers of rapid diving. Now this depends, I think, altogether upon the extent to which they are annoyed and persecuted. The tamest Ducks, or even Coots, could not be more unwatchful and unsuspicious than were the Loons and Grebes here at San Pedro bay. As our boat sailed along they would rarely move off before giving me a fair shot; and I almost invariably killed my bird, since they did not dive so quickly as to avoid the shot. And about the wharf, and among the boats moored near it, they swam as unconcernedly as tame Ducks. I remember once when I could have struck a *Colymbus pacificus* with a boat-hook. And leaning over the taffrail of some vessel, with several of these Loons quietly disporting in the water below me, I felt that indeed I was a favoured ornithologist; for how many of my brethren have been able to study Loons in their native wilds, only a few feet from the eye, and to note every motion, when in, or on, or over the water? Their appearance when returning to the surface after a long dive is peculiar; and really they look more like fish

than birds. The bubbles of air clinging all over their backs gives them a beautiful spangled appearance; and when emerging from the sea, with a slight shiver of the feathers these spangles disappear; the water rolls away too, and the feathers are as dry as though they had not been submerged. A common habit with all the Loons is to swim slowly about with the neck gracefully curved, and the bill thrust up to the eyes in the water. What this is for I really do not know; certain it is I never saw them take fish or other food in this way. They seemed to be simply *tasting* the water.

The species we saw were *C. torquatus* (or *glacialis*, as Mr. Sclater would contend), *C. septentrionalis*, and *C. pacificus*. Concerning this last, there is now really no doubt, I think, that it is a species exceedingly closely related to *C. arcticus*, and in fact scarcely to be distinguished except by some differences of dimension, as stated in my "Review of the *Colymbidæ* and *Podicipidæ*"*. Mr. Lawrence's types were young birds; but dozens of mature ones, in breeding-plumage, which I have examined, show precisely the pattern of coloration that obtains in adult *C. arcticus*.

The Grebes we saw were *Æchmophorus occidentalis* and *Podiceps californicus*, both of which were very common, the latter the most so, on the lagoons back from the sea as well as on the bay. The first named is a splendid-looking bird on the water, riding very lightly, its long neck held erect, the bill pointing horizontally forwards. This length of neck makes the motion during the act of diving a very peculiar one; and not one of them ever was quick enough to escape my shot. They fly with both neck and feet outstretched. It is a pity the colours of some parts change in drying; they are so very beautiful. The iris is bright orange-red, with a shade of pink; and on widely separating

* *Vide* Proc. Acad. Philad. April 1862, p. 28. Dr. Cooper has obligingly furnished me, from his MS. notes, the following description:—"Adult female, San Diego, Cal., May 6. Differs from *C. arcticus*, as figured and described by Audubon, in the smaller size; spots on wing-coverts oblong, not round; outer edge of quill black, not grey; tail black. Purple of throat rounded below instead of pointed. No black and white streaks on front of neck. Tarsi and feet black. The webs and outside of the feet bluish in life."

the eyelids, a narrow ring of pure white is seen encircling the cornea. The bill is rather bright yellow, the culmen and gonys more greenish; the hard parts of the mouth the same, the soft fauces light purple or lavender. The insides of the legs and soles of the feet are black; the outside of the tarsus and dorsum of the foot dull bluish-green; the centres of each web yellowish flesh-colour. I found their stomachs crammed with a species of slender aquatic grass.

All these birds were around us while on the bay. A long low sandy island lies across its mouth as a breakwater; and on the sea-side of this the Doctor assured me I should see another bird that does not ever leave the sea-beach itself, and withal so rare in collections as to make the acquisition of good specimens a matter of some consequence. It was the *Ægialites nivosus* of Cassin, first noticed, I believe, by Dr. A. L. Heermann, in the Ornithological Report of Lieut. R. S. Williamson's Survey for a Pacific Railroad (1859, p. 64), under the name of "*Charadrius cantianus*, Lath.," but very different, of course, from any other North American or European Plover—so much so, indeed, that Bonaparte places it in his genus *Leucopolius*. It was only a few hundred yards from where we landed, on the bay side of the island, to the shore of the "far-resounding sea;" but, by racing at full speed through the heavy soft sand, joined to the exciting expectation of so soon seeing a new bird, I was quite breathless, and my heart was thumping furiously by the time I stepped on the moist sand. Yes! there they were sure enough, a flock of snow-white little beauties, dallying so fearlessly with the huge waves. I fancy my chagrin and disgust must have partaken a little of the sublime when, after blindly blazing away into the flock, I picked up a capful of—*Sanderlings*! Dr. Cooper's cachinations nowise tended to smooth my ruffled mental plumage. However, a few moments afterwards a flock of *Æ. nivosus* alighted close by me; and, with a little patience and strategy, I soon had a dozen of the lovely birds in my hands. They are not at all shy, rather the reverse; but the hue of their backs so exactly corresponds with that of the sand, that it is next to impossible to see them until they move. I believe they never leave the open sandy beach for lagunes or mud-flats.

They are found in little flocks of from two or three to as many dozen, and associate in the utmost intimacy with *Calidris arenaria*. On approach they run swiftly, with lowered heads, only taking flight when hard pressed; but they scatter and straggle so much that it is difficult to kill many at a shot. At high tide they are found in the loose, uneven, dry sand just above the water-mark, but at other times feed in the wet sand and among the weed-covered rocks, quite among the breakers. They fly rapidly, in close flocks, wheeling so as to show alternately the upper and under parts. Their note is a low mellow whistle. Those that I shot were not very fat. In the winter plumage the rufous-brown cap is wanting, the crown being nearly or quite the same colour as the back. The bill is black; the eyes dark brown; the legs pale livid blue; the feet blackish. Length from 6·5 to 7 inches, extent of wings 13·5 to 14 inches.

I should like much to take my readers with me on the Pacific, that we might study together such rare and interesting birds as *Cerorhina monocerata*, *Ptychorhamphus aleuticus*, *Brachyrhamphus hypoleucus*, and the numbers of little-known Petrels that enrich the coast of Lower California. But the length of this paper warns me that I must check my restless pen.

Washington, D. C., January 29, 1866.

[*From the Proceedings of the Boston Society of Natural History, Vol. XII, October 7, 1868.*]

Synopsis of the Birds of South Carolina. By Elliott Coues, M. D.

The following list is believed to contain all the species occurring in the State, whether as residents, migrants, summer or winter visitants, or of casual appearance. Care has been taken to determine, as far as possible, in every case, to which category the species belongs. The ascertaining of the species that winter in the State is a matter of especial interest in determining the range of migrants; and has therefore been taken into particular consideration. An excellent idea of the distribution of birds along the Atlantic States may be gained by comparison of the present list and those mentioned in the accompanying foot note.[1] A good list of Floridan birds would be an acceptable contribution.

[1] Catalogue of the Birds found at Norway, Maine. With a list of the Birds

The birds of South Carolina, with few exceptions, are the same as those of the South Atlantic and the Gulf States at large (exclusive of certain Texan birds). These exceptions are the Florida Jay, and the several species, not strictly North American, which visit the peninsula of Florida alone, mostly from the West Indies. It is not probable that South Carolina is the terminus of the autumnal migration of any Northern species. The lower swampy parts of Virginia rather represent such terminus; and any species which passes this boundary is likely to be found in winter any where in the South Atlantic States, exclusive, of course, of such species as pass entirely beyond the United States. And, although the Carolinas, in a general way, limit the northward extension of the few typical species of the South Atlantic States, the boundary may be more definitely placed in Virginia, along the line where the swampy changes to the higher country, which, as we have just seen, limits certain Northern species in coming South.

Regarding the distribution of species within the State, it may be said, in general terms, that the topography of the country has great influence in determining the presence or absence of species in particular districts. Many birds that abound in the low swampy regions, never reach the upper country; and the converse of this is also true, though by no means of so extensive application. Some birds that occur high up only in summer, are resident throughout the year in the warmer parts; where, doubtless, certain Northern species, that come South in winter, are rarely, if ever, found. These and some analogous facts that might be cited, are independent of those circumstances of distribution arising from the natural proclivities of species; as e. g., the restriction of marine species to the coast, etc. As to the true migrants,—those birds that neither breed nor pass the winter in the State,—it may be stated that they appear a little earlier in the spring, and later in the fall, in the low swampy parts, than in the upper country.

found in Maine not observed at Norway. By A. E. Verrill. Proceedings of the Essex Institute, III, 1862, p. 136.

Catalogue of the Birds of Springfield, Mass., with a list of Birds found in Massachusetts not observed at Springfield. By J. A. Allen. *Ibid*, IV, 1864, p. 48.

Catalogue of Birds observed on New York, Long and Staten Islands, and adjacent parts of New Jersey. By George N. Lawrence. Annals of the Lyceum of Natural History of New York, VIII, 1866, p. 279.

List of Birds ascertained to inhabit the District of Columbia, etc. By Elliott Coues and D. Webster Prentiss. Annual Report of the Smithsonian Institution, for 1861, p. 399.

The non-resident birds of South Carolina, that pass through the State during their migrations, appear, I think, fully two weeks earlier in spring, and as much later in the fall, than they do at Washington, D. C. The same is true of those species, common to the two localities, that breed or pass the winter in the State. This is, of course, to speak only of the general average.

The only article that I have been able to find bearing directly upon the subject in hand, is a list in the appendix of Tuomey's Report on the Geology of South Carolina, published in 1848. This appendix, entitled "Catalogue of the Fauna of South Carolina," was prepared by Professor Lewis R. Gibbes, of the Charleston College. The list of the birds, as the author states, is simply a compilation from Audubon's Synopsis. The writer enumerates 271 species; among which Haliaëtus Washingtoni, Vireo Bartrami, Ammodramus Macgillivrayi, and Cygnus buccinator should, in all probability, not have been admitted. The occurrence of one or two other species contained in the list is extremely problematical. Prof. Gibbes indicates, in the instances of the majority of the species, whether the bird is resident, or a summer or winter visitant. The letter (G.) in the following list indicates my indebtedness to Prof. Gibbes; in other cases, the statements made are the results of my own investigations, chiefly conducted at Columbia during the past two years.

Note.—I use the following abbreviations;—*Res.*, resident; *sum.*, summer, and *win.*, winter—both as either verb or noun; *spr.*, spring; *aut.*, autumn; *migr.*, migrant, migrate, migratory, migration, according to context; *ab.*, abundant; *com.*, common; *N.*, north; *S.*, south: the usual contractions for names of months. Species characteristic of the South Atlantic and Gulf States are preceded by an asterisk. The classification made use of is the modification of Prof. Lilljeborg's recently adopted by the Smithsonian Institution; the nomenclature is, in general, that of Baird's "Birds of North America."

PASSERES—(OSCINES).

Fam. 1.—Turdidæ.

1. *Turdus mustelinus.* Wood Thrush. Com.; res.; the greater number go further N. to breed, and further S. to win.

2. *T. Pallasii.* Hermit Thrush. Com.; win., from Oct. to Mch.; not known to breed.

3. *T. fuscescens.* Wilson's Thrush. Not ab.; chiefly spr. and aut. migr.; some probably win.

4. *T. solitarius.* Olive-backed Thrush. As the preceding.

5. *T. migratorius.* Robin. Ab.; win. from Oct. to Apr., particularly during Nov. and Feb.; a few doubtless sum.

In addition to the preceding, *T. Aliciæ* probably occurs, as a migrant.

6. *Harporhynchus rufus.* Thrasher. Com.; res.

7. *Galeoscoptes carolinensis.* Catbird. Ab.; res.

8. *Mimus polyglottus.* Mocking-bird. Very ab.; res. Although the Mocking-bird sometimes strays even to New England, it is not common north of the lower parts of Virginia. In some parts of the Carolinas it is perhaps the most abundant bird. It raises two or three broods each summer; young birds may be found from April until September; four eggs are oftener laid than either three or five. The early broods are reputed to make the finest singers, and also to be reared artificially with less trouble than those hatched later. The birds sing more or less all the year; and, particularly during the breeding season, at any hour of the night.

Fam. 2. — SAXICOLIDÆ.

9. *Sialia sialis.* Bluebird. Ab.; res.; but most numerous in win., from Oct. to Apr.

Fam. 3. — SYLVIIDÆ.

10. *Regulus satrapa.* Golden-crested Kinglet. Com.; win.; from Oct. to Apr.

11. *R. calendula.* Ruby-crowned Kinglet. Ab.; win.; from Oct. to Apr.; but most numerous in Nov. and Mch.

12. *Polioptila cærulea.* Blue-gray Gnatcatcher. Com.; chiefly migr., Mch. 15 to Apr. 15, and during Oct.; some breed; none known to win.

Fam. 4. — PARIDÆ.

13. *Lophophanes bicolor.* Tufted Titmouse. Com.; res.

14. *Parus carolinensis.* Carolina Chickadee. Com.; res.

Fam. 5. — SITTIDÆ.

15. *Sitta carolinensis.* White-bellied Nuthatch. Com.; res.

16. *S. canadensis.* Red-bellied Nuthatch. Rare; res. (G.)

17. **S. pusilla.* Brown-headed Nuthatch. This species is not so common as one would be led to infer from the fact that it is one of the characteristic birds of the South Atlantic States. Its habits are

the same as those of its better known congeners; its notes, however, differ from those of *S. carolinensis*, and greatly resemble those of *S. pygmæa*. The birds are generally found in open pine woods, usually in small straggling companies.

Fam. 6. — CERTHIIDÆ.

18. *Certhia americana*. Brown Creeper. Not ab.; res.

Fam. 7. — TROGLODYTIDÆ.

19. *Thryothorus ludovicianus*. Carolina Wren. Com.; res.

20. *T. Bewickii*. Bewick's Wren. Rare; res.?

21. *Troglodytes ædon*. House Wren. Probably res.; but chiefly migr. from Mch. 15 to Apr. 15, and during Oct. Prof. Gibbes omits this species, giving, perhaps in place of it, *T. americanus*. The latter I do not venture to include in the list.

22. *Anorthura hyemalis*. Winter Wren. Not com.; win., from Oct. to Apr.

23. *Cistothorus stellaris*. Short-billed Marsh Wren. Win. (G.)

24. *Telmatodytes palustris*. Long-billed Marsh Wren. Com. in certain situations; res., but the greater number pass N. to breed.

Fam. 8. — MOTACILLIDÆ.

25. *Anthus ludovicianus*. Titlark. Ab.; win., from Nov. to Mch.; sometimes till Apr.

Fam. 9. — SYLVICOLIDÆ.

26. *Mniotilta varia*. Black-and-white Creeper. Com.; chiefly migr., Mch. and Oct., but some breed; not known to win.

27. *Parula americana*. Blue Yellow-backed Warbler. Ab.; migr., during Apr. and Oct.

28. **Protonotaria citrea*. Prothonotary Warbler. Rare; sum. This is properly a bird of the South Atlantic States, though in the interior it goes as far north as Kansas and Missouri; and it has even been found (in one instance) in Maine. At Washington, D. C., I never saw but one individual during several years' collecting. It winters in the extreme South, as well as in Central America and some of the West Indies.

29. *Helminthophaga celata*. Orange-crowned Warbler. Either the distribution of this species is very irregular, or we do not understand it very well It is a common and regular migrant in the

Western Territories; but east of the Mississippi it is believed to be rare or casual. Audubon gives it as a common summer resident in New England; but more recent ornithologists differ with him in opinion. Mr. J. A. Allen, however, has lately found it at Springfield, Mass. (Proc. Essex Inst. IV, 1864, p. 60; ibid. V, 1868, p. 271.) Nuttall attests its abundance in Florida. Prof. Baird records it from Wisconsin and Georgia. Prof. Gibbes marks it "win." in his list. I have myself never met with it except in Arizona and California. It is known to breed in Arctic America, and to winter in Mexico.

30. *H. ruficapilla.* Nashville Warbler.

31. *H. pinus.* Blue-winged Yellow Warbler.

32. *H. chrysoptera.* Golden-winged Warbler.

33. *H. peregrina.* Tennessee Warbler.

These four species are all migrants, with much the same times of arrival and departure; neither of them is abundant.

34. **H. Bachmani.* Bachman's Warbler. Very rare; sum.; chiefly confined to the coast, and not recorded N. of S. Car. Prof. Lambeye gives it as a bird of Cuba.

35. **Helmitherus Swainsoni.* Swainson's Warbler. Very rare; sum. This is another highly characteristic species, also occurring in Cuba.

36. *H. vermivorus.* Worm-eating Warbler. Not uncom.; most numerous during its migr., in Apr. and Oct.; sum.

37. *Perissoglossa tigrina.* Cape May Warbler. Rare; migr.

38. *Dendrœca pinus.* Pine-creeping Warbler. Very ab.; res. This is perhaps the most common warbler, and is the only resident one. It breeds very early; I have seen fully fledged young before the middle of April. It is found in all situations, but shows a preference for the forests from which it takes its name; and is generally seen in straggling companies, associating with Chickadees, Nuthatches, Kinglets, etc.

39. *D. coronata.* Yellow-rumped Warbler. Very ab.; win.; from latter part of Oct. until May; most numerous in Nov. and Mch.

40. *D. palmarum.* Yellow Red-poll Warbler. Com.; win. from Oct. until late in Apr.

41. *D. æstiva.* Summer Warbler. Com.; sum.; but most ab. during its migr., as by far the greater number pass N.; not known to win.

42. **D. dominica* (*pensilis* s. *superciliosa*, auct.). Yellow-throated Warbler. Com.; sum. This species should have the asterisk, as it is

essentially a southern one; but still it has been found at Washington, D. C., (Coues and Prentiss, Smiths. Rep. for 1861, p. 408; Baird, Rev. Am. Birds, p. 209), and at Cleveland, Ohio, (*l. c.*). It is more abundant in some parts of the State than is generally supposed. I have seen several in one day in the streets of Columbia. It winters very far south.

43. *D. virens.* Black-throated Green Warbler.

44. *D. cærulescens.* Black-throated Blue Warbler.

45. *D. Blackburniæ.* Blackburnian Warbler.

46. *D. castanea.* Bay-breasted Warbler.

47. *D. pennsylvanica.* Chestnut-sided Warbler.

48. *D. striata.* Black-poll Warbler.

49. *D. cærulea.* Cœrulean Warbler.

50. *D. maculosa.* Black-and-yellow Warbler.

51. *D. discolor.* Prairie Warbler.

The foregoing nine species are all migrants, passing through chiefly in April and Oct.—*D. striata* being rather the latest. *D. cærulea* is the rarest; *D. discolor* probably next most so; the other seven are common.

52. *Seiurus noveboracensis.* Water Wagtail. Not ab.; chiefly migr. Some probably breed.

53. *S. aurocapillus.* Golden-crowned Wagtail. Com.; migr.; some doubtless breed.

54. *S. ludovicianus.* Large-billed Wagtail. Rare; migr.; some doubtless breed. Dr. Prentiss and I found it to be quite common at certain seasons about Washington, D. C. (Smiths. Rep. for 1861, p. 407.) It is recorded by Mr. Lawrence from New York (Ann. Lyc. Nat. Hist., N. Y., VIII, 1866, p. 284), and by Prof. Baird from Pennsylvania and Michigan. (Rev. Am. Birds, p. 217.)

55. *Oporornis agilis.* Connecticut Warbler.

56. *O. formosus.* Kentucky Warbler.

These two species are rare migrants. I have found *formosus* in Kansas, in May. This is, I believe, its most western United States record. Both species proceed as far north, at least, as Southern New England.

57. *Geothlypis trichas.* Maryland Yellow Throat. Com.; sum.; most numerous during its migr., in Apr. and Oct.

58. *G. philadelphia.* Mourning Warbler. Very rare; migr.

59. *Icteria viridis.* Yellow-breasted Chat. Com.; sum.; but most numerous during its migr.

60. *Myiodioctes mitratus.* Hooded Warbler. Rare; migr.; some

breed? This is rather a Southern species, whose range just reaches the extremity of New England. It is known to winter in Central America and the West Indies.

61. *M. canadensis.* Canada Warbler. Com.; migr.; Apr. and Oct.

62. *M. pusillus.* Wilson's Black-capped Warbler. Not com.; migr.; Apr. and Oct.

63. *Setophaga ruticilla.* Redstart. Com.; migr.; Apr. and Oct.

Fam. 10. — HIRUNDINIDÆ.

64. *Progne subis.* Purple Martin. Ab.; sum., from early in Apr. through part of Oct. This is the most abundant bird of the family about Columbia.

65. *Hirundo bicolor.* White-bellied Swallow.

66. *H. horreorum.* Barn Swallow.

These two species are chiefly migr. latter part of Mch., Apr. and Oct., but some breed. I do not know of the occurrence of *H. lunifrons*, but there is reason to believe that it may pass through during its migrations.

67. *Cotyle riparia.* Bank Swallow. Com.; chiefly migr.; Apr. and Oct.; "sum." (G.)

68. *Stelgidopteryx serripennis.* Rough-winged Swallow. "Sum." (G.)

Fam. 11. — VIREONIDÆ.

69. *Vireo olivaceus.* Red-eyed Vireo. Com.; sum.; but the greater number pass N. in Apr., and return in Oct.

70. *V. gilvus.* Warbling Vireo. Not ab.; migr. in Apr. and Oct.; few, if any, breed so far south.

71. *V. flavifrons.* Yellow-throated Vireo. Com.; sum.; Apr. to Oct. 15.

72. *V. solitarius.* Blue-headed Vireo. Rare.; migr.

73. *V. noveboracensis.* White-eyed Vireo. Com.; sum.; but the greater number go further N.

V. philadelphicus should undoubtedly be included in the list; but I have no authority for so doing. Prof. Gibbes gives a certain "*Vireo Bartrami* Sw."; I do not know to what species he refers under this name. (Examine, in this connection, Baird, Rev. Am. Birds, I., 1866, pp. 334, 343.)

Fam. 12. — AMPELIDÆ.

74. *Ampelis cedrorum.* Cedar Bird. Res.; but most numerous in win., from Nov. to Mch., during which months it is exceedingly abundant at times and in certain places, in large, straggling, erratic flocks. I have seen it in flocks through May.

Fam. 13. — LANIIDÆ.

75. **Collurio ludovicianus.* Loggerhead Shrike. Res.; ab., particularly in the lower parts of the State. A species highly characteristic of the South Atlantic and Gulf States, being only known from North Carolina to Louisiana (in the Gulf States only in winter, according to Audubon), and also being rarely, if ever, found in mountainous districts.

Audubon says (Orn. Biog. I, p. 301) : "I have never seen it attack birds, nor stick its prey on thorns, in the manner of the Great American Shrike." Against this negative evidence I can bear positive testimony, so far as the latter part of the statement is concerned. At Columbia, where the Loggerhead is a very common bird, frequenting the weedy streets and waste fields of the city, I have observed it on numerous occasions, and once witnessed the following: a Loggerhead was busily foraging for insects in the Capitol yard; from its observatory on the top of a tall bush, it pounced upon a large grasshopper and carried it to a tree near by, which was full of small, sharp twigs. Firmly planting itself upon one of these, with the insect in its beak, the bird thrust the grasshopper upon a twig, pushing the latter quite through the insect's body by repeated forcible movements. After the grasshopper had been transfixed to the bird's satisfaction, the latter hopped to another part of the tree, where it remained for some minutes, apparently enjoying the writhings of the impaled insect, or at least waiting to make sure that it was firmly secured. This being evidently the case, the bird at length flew off, resumed its former station, and commenced to hunt for more grasshoppers. Within the next few minutes I saw it capture several more, all of which it ate upon the spot.

I have not seen any satisfactory explanation of this strange habit of the Shrikes; nor am I prepared to offer any. Writers have drawn largely upon their imagination in treating of the trait. The facts at our command are conflicting, and do not furnish the basis for any very consistent theory as to the why or wherefore, or, particularly, the *cui bono* of such proceedings on the part of the bird. The com

monly received doctrine, to the effect that Shrikes providently lay up in this way a store for future emergencies, is hardly tenable. In the case narrated above, the bird did not return to feast upon the grasshopper; for I purposely passed that way several days afterward, and saw the unfortunate insect still sticking there. Why did the bird impale it at all? It was evidently hungry at the time, for, as above stated, it at once recommenced foraging, and captured and devoured several more insects on the spot; and, moreover, the thousands of live grasshoppers that there were within a radius of as many yards, rendered such special pains in securing that one on a twig quite unnecessary. It may be as well to confess that we do not know the reason of this habit of the Shrikes; we can only say that it is "a way they have."

Swainson long ago pointed out the remarkable similarity between Shrikes and Mocking-birds—a resemblance not confined to physical characters, though very striking in these respects, but also extending to some points of habit, general appearance in life, etc., and amounting to strong analogy, if not actual affinity. I have frequently seen Shrikes and Mocking-birds playing together, and can affirm that it is very difficult to tell the two birds apart at a little distance, without very attentive observation. The Shrike is the smaller of the two and is more heavily built, thick-set, with shorter neck, larger head and heavier bill. Its motions are ordinarily less lively and varied; its usual attitude, when perched, is stiffer; there is less of the quivering, tremulous motion of the wings and tail; the flight is less buoyant and graceful, more firm and direct, and accompanied by a peculiar jerking of the body at each beat of the wings. These remarks, however, do not apply to the spirited, dashing forays of the Shrike, when in pursuit of its prey. But, ordinarily, the tournure of the Shrike has that about it which gives an impression best expressed by the word "top-heaviness."

The Great Northern Shrike, *C. borealis*, may occasionally stray, in winter, as far south as Carolina, but I have no record of its occurrence beyond Washington, D. C.

Fam. 14. — Tanagridæ.

76. *Pyranga æstiva.* Summer Red-bird. Ab.; sum.

77. *P. rubra.* Scarlet Tanager. Com.; sum.; but chiefly migr. in Apr., Sept. and early Oct.

Fam. 15. — ALAUDIDÆ.

78. *Eremophila cornuta.* Shore Lark. Com.; in flocks, Nov. to middle of Mch.

Fam. 16. — FRINGILLIDÆ.

Such hordes of sparrows enter the Carolinas in October, and pass the winter, that one is almost tempted to believe that these States form their winter quarters. The small streaked and spotted species— the sparrows *par excellence* — mostly associated together, and are sometimes seen in flocks to be numbered by thousands. During the winter they frequent old corn, rice, and cotton fields, briery tracts, hedgerows, etc. In the spring, for a few weeks before the great body of them depart, they scatter in smaller companies through the woods and feed extensively upon buds of trees, as well as insects. The extent to which our small conirostrals feed upon these articles in spring, is perhaps hardly recognized, except in the cases of such birds as the *Carpodaci*, etc.

79. *Carpodacus purpureus.* Purple Finch. Com.; win.; from Oct. until all the buds have expanded; stragglers at least through greater part of Apr.

80. *Chrysomitris tristis.* Gold Finch. Ab.; res.

81. *C. pinus.* Pine Finch. Not com.; irregular; win. Nov. to Apr.

We have no record of the occurrence of either Snow Buntings, Crossbills, or Redpolls, so far south; but they may possibly occasionally stray to the Carolinas in severe winters, as even the Snowy Owl is known to do.

82. *Passerculus savanna.* Savannah Sparrow. Very ab.; Oct.— Apr., in large flocks, with other species. In coming S. in the fall, most of these birds do not stop short of the Carolinas, though a few pass the winter at Washington, D. C. None breed so far S.

83. *Poocætes gramineus.* Grass Finch. Extremely ab.; win., Oct.—Apr.; a few possibly breed. The Grass Finches are particularly fond of cotton fields; I have met with flocks of many hundreds in such situations. When such a flock is startled from the ground, the shadowy gray forms, inextricably confused in erratic flight, and the continuous whirr of numberless wings conspire to a scene not easily forgotten. The little birds soon after their arrival become extremely fat, and when in this condition there are no more delicious morsels to be found for the table.

84. *Coturniculus passerinus.* Yellow-winged Sparrow. Com.; res.; most numerous during the migr.

85. *C. Henslowi.* Henslow's Sparrow. Rare; res.? "win." (G.) The known range of this rather Southern species has been recently extended by its record in New England.

86. *Ammodramus caudacutus.* Sharp-tailed Finch.

87. *A. maritimus.* Sea-side Finch.

Prof. Gibbes gives these two species as resident. They are probably confined to the immediate vicinity of the coast, and are more numerous in winter than in summer, as they scatter along our shores to New England during the breeding season. "*A. Macgillivrayi,*" No. 110 of Prof. Gibbes' list, is now well known to be the young of *maritimus.*

88. *Zonotrichia leucophrys.* White-crowned Sparrow. Not ab.; win.; Oct. through part of Apr. I believe that most individuals of this species do not come quite so far south to pass the winter. Its migrations appear less regular and well defined than those of the following species. The birds probably scatter indiscriminately over the greater part of the Atlantic States in winter; at least, I know of no special localities that are indicated, by the abundance of the species, as the favorite winter quarters of the great number that breed in Labrador, etc.

89. *Z. albicollis.* White-throated Sparrow. Very ab.; win.; Oct., through most of Apr. These birds sing more or less all winter; and for a month before they leave in spring, the woods and fields are vocal with their mellow music. Many hundreds pass the month of March, and part of April, in the gardens in the city of Columbia; during the winter the birds mostly reside in thickets and fields, in company with several other species.

90. *Junco hyemalis.* Snowbird. Very com., though rather less ab. than in localities further N.; arrives latter part of Oct. (the time varying somewhat, according to weather), and remains until Apr.; stragglers may be seen through part of this month.

91. *Spizella monticola.* Tree Sparrow. Win.; Nov.—Mch.; not common, as the greater number winter in the Middle States, Maryland, Virginia, etc., and some as far north as New England.

92. *S. socialis.* Chipping Sparrow. Res.; but the numbers that breed are insignificant compared with those that win. from Oct. to Apr. They begin to flock upon their arrival, and remain in com-

panies, sometimes numbering hundreds of individuals, until the greater part pass north to breed.

93. *S. pusilla.* Field Sparrow. Very com.; res.; most numerous in win., and particularly in Nov. and Mch.

94. *Melospiza melodia.* Song Sparrow. Very ab.; res.; but most numerous in win., as great numbers pass N. to breed.

95. *M. palustris.* Swamp Sparrow. Com.; chiefly win.; perhaps res., but the greater number breed further N. This is perhaps the shyest and most retiring of our sparrows, the *Ammodrami*, even, not excepted; and one that easily eludes observation. It is to be found usually in such situations as the Song Sparrows frequent in winter; but I have never found a locality where its numbers bear any proportion to those of the latter. *M. melodia* is one of our most commonly observed species, particularly when it is flocking.

M. Lincolni ought to occur in winter; but it has not, to my knowledge, been observed in the State.

96. **Peucæa æstivalis.* Bachman's Finch. This, the only characteristic sparrow of the Southern States, I have not been so fortunate as to meet with. My friend, Prof. LeConte of the South Carolina University, informs me that it occurs about Columbia, and elsewhere in the State, frequenting open pine woods, old dry fields, etc. Prof. Gibbes gives it as summering. It appears to be more abundant in Georgia than elsewhere.

97. *Passerella iliaca.* Fox Sparrow. Com.; win.; Nov. to Apr.; less numerous than most of the sparrows properly so called.

98. *Euspiza americana.* Black-throated Bunting. "Sum." (G.) It is an abundant summer resident at Washington, D. C.; a few reach Southern New England. It must be a rare bird in the State. Audubon says that it is "rarely observed to pass over South Carolina," which statement accords with my own observations. Audubon's further remark, concerning its partiality for particular localities, is well founded. Does this species winter anywhere in the United States?

99. *Guiraca cærulea.* Blue Grosbeak. Not uncom.; sum.

100. *G. ludoviciana.* Rose-breasted Grosbeak. Rare; migr.

101. *Cyanospiza cyanea.* Indigo Bird. Com.; sum.

102. **C. ciris.* Painted Bunting. "Sum." (G.) This species is probably confined to the lower country, and appears to be rare even there. I have not met with it about Columbia. The Carolinas limit its northern range.

103. *Cardinalis virginianus.* Red Bird. Res.; com.

104. *Pipilo erythrophthalmus.* Towhee Bunting. Ab.; chiefly migr.; many win.; a few possibly breed in mountainous districts. It is most numerous in Nov. and Mch.

Fam. 17. — ICTERIDÆ.

105. *Dolichonyx oryzivorus.* Reed or Rice Bird. Win.; but most abundant during the migr.

106. *Molothrus pecoris.* Cow Bird. Probably res.; but chiefly win., and most numerous in spring and fall.

107. *Agelæus phœniceus.* Red-winged Blackbird. Com.; res., but most numerous during the migr.

108. *Sturnella magna.* Meadow Starling. Com.; res.

109. *Icterus Baltimorensis.* Baltimore Oriole. Sum.; not. ab., as the greater number pass N.

110. *I. spurius.* Orchard Oriole. Rare; chiefly migr.; some probably breed.

111. *Scolecophagus ferrugineus.* Rusty Grackle. Not uncom.; in win. in flocks, from Nov. to Mch.

112. *Quiscalus versicolor.* Purple Grackle. Com.; res.; but the greater number pass N. to breed.

113. **Q. major.* Boat-tailed Grackle. Res.; chiefly confined to the lower country. This is essentially a southern bird, though it is said to stray as far north as Massachusetts.

Fam. 18. — CORVIDÆ.

114. *Corvus carnivorus.* Raven. "Res." (G.) If really a resident of the State at present, it must be an exceedingly rare bird. I am under the impression that I once saw an individual at Columbia, but cannot speak positively.

115. *C. americanus.* Crow. Com.; res.

116. *C. ossifragus.* Fish Crow. Res. Chiefly confined to the lower country.

117. *Cyanura cristata.* Blue Jay. Very ab.; res.

PASSERES — (CLAMATORES).

Fam. 19. — TYRANNIDÆ.

118. *Tyrannus carolinensis.* Kingbird. Com.; sum., Apr. 1st, through part of Oct.; but the greater number go further N.

119. *Myiarchus crinitus.* Great crested Flycatcher. Com.; sum. Apr, 15 to Oct.; but the greater number go further N.

120. *Sayornis fuscus.* Pewee. Probably res., most numerous in Feb., Mch., Oct. and Nov. This bird is to be found so late in the fall, and so early in the spring, that I have little doubt it passes the winter in some parts of the State. The majority go further N. to breed.

121. *Contopus virens.* Wood Pewee. Com.; sum.; middle of Apr. to middle of Oct.

122. *C. borealis.* Cooper's Flycatcher. Inserted on Prof. Gibbes' authority; I have never met with the species. It is probably a migrant only. Its distribution is not very clearly defined.

123. *Empidonax Traillii.* Traill's Flycatcher.

124. *E. acadicus.* Acadian Flycatcher.

125. *E. flaviventris.* Yellow-bellied Flycatcher.

126. *E. minimus.* Least Flycatcher.

These four species occur as migrants in April and September; *acadicus* probably breeding. The latter is the only one contained in Prof. Gibbes' list.

STRISORES.

Fam. 20. — Alcedinidæ.

127. *Ceryle alcyon.* Kingfisher. Com.; res.

Fam. 21.— Caprimulgidæ.

128. *Chordeiles popetue.* Nighthawk. Com.; sum.; but most abundant in Apr., Aug. and Sept.

129. *Antrostomus vociferus.* Whippoorwill. Com.; sum.; Apr. to Oct.

130. **A. carolinensis.* Chuckwillswidow. Rare; sum. (G.) This species is not known to occur north of the Carolinas. Audubon gives it from Texas.

Fam. 22. — Cypselidæ.

131. *Chætura pelasgia.* Chimney Swift. Ab.; sum.; Apr.—Sept.

Fam. 23. — Trochilidæ.

132. *Trochilus colubris.* Humming-bird. Com.; sum.; Apr.—Sept.

ZYGODACTYLI.

Fam. 24. — Cuculidæ.

133. *Coccygus americanus.* Yellow-billed Cuckoo. Com.; sum.; Apr. to Oct.

134. *C. erythrophthalmus.* Black-billed Cuckoo. Rare; sum.; but chiefly migr., Apr.—Sept., as the greater number breed further N.

Fam. 25. — Picidæ.

135. *Campephilus principalis.* Ivory-billed Woodpecker. Res.; rare, and chiefly confined to the lower country.

136. *Hylatomus pileatus.* Pileated Woodpecker. Res.

137. *Picus villosus.* Hairy Woodpecker. Res.; not ab.

138. *P. pubescens.* Downy Woodpecker. Res.; com.

139. **P. querulus.* Red-cockaded Woodpecker. Res. (G). This species is hardly known to occur north of the Southern States; and though it be the *borealis* of Vieillot,—which is doubted by some—the latter name is geographically inaccurate.

140. *Sphyrapicus varius.* Yellow-bellied Woodpecker. Res.; ab.

141. *Centurus carolinensis.* Red-bellied Woodpecker. Res.

142. *Melanerpes erythrocephalus.* Red-headed Woodpecker. Res.; ab., particularly in sum.

143. *Colaptes auratus.* Yellow-winged Woodpecker. Res.; ab.

Fam. 26. — Psittacidæ.

144. *Conurus carolinensis.* Paroquet. This species is given in Prof. Gibbes' list, and appears to have been in former times a common bird; but its occurrence has not been noted of late years. It is scarcely entitled to a place in the list.

ACCIPITRES.

Fam. 27. — Strigidæ.

145. *Strix pratincola.* Barn Owl. "Sum." (G.) Res.?

146. *Bubo virginianus.* Great Horned Owl. Res.

147. *Scops asio.* Screech Owl. Res.

148. *Otus Wilsonianus.* Long-eared Owl. Res.

149. *Brachyotus palustris.* Short-eared Owl. Res.

150. *Syrnium nebulosum.* Barred Owl. Res.

151. *Nyctale acadica.* Acadian Owl. Res.

152. *Nyctea nivea.* Snowy Owl. Win. There are several authentic instances of the occurrence of this species in winter. Prof. Gibbes includes it.

Fam. 28. — FALCONIDÆ.

153. *Falco anatum.* Peregrine Falcon. Win. (G.)

154. *F. columbarius.* Pigeon Hawk. Win.; perhaps res.

155. *F. sparverius.* Sparrow Hawk. Res.; com.

156. *Accipiter Cooperi.* Cooper's Hawk. Res.

157. *A. fuscus.* Sharp-shinned Hawk. Res.; com.

158. *Buteo borealis.* Red-tailed Hawk. Res.; com.

159. *B. lineatus.* Red-shouldered Hawk. Res.; com.

160. *Elanus leucurus.* Black-shouldered Hawk. Sum.; rare. The Carolinas limit the northward extent of this species in the Atlantic States.

161. *Ictinia mississippiensis.* Mississippi Kite. Sum. Along the Atlantic coast this species has much the same range as the preceding.

162. *Nauclerus furcatus.* Swallow-tailed Kite. Sum. With much the same distribution, in general, as the preceding, this species is more apt to stray northward. It has occurred in Pennsylvania, Wisconsin, Missouri, etc.

163. *Circus hudsonicus.* Marsh Hawk. Res.; ab.

164. *Haliætus leucocephalus.* Bald Eagle. Res. Prof. Gibbes also gives "*H. Washingtonii.*" I do not know what this can be, unless possibly he means the Golden Eagle, *Aquila canadensis*.

165. *Pandion carolinensis.* Fish Hawk. Res.; com.

In addition to the foregoing *Falconidæ*, two others, *Buteo pennsylvanicus*, and *Archibuteo lagopus* probably occur, but I have no evidence that such is the case.

Fam. 29. — VULTURIDÆ.

166. *Cathartes aura.* Turkey Buzzard.

167. *C. atratus.* Black Vulture.

These two species are common, and resident. *C. aura* is more generally distributed over the State, *atratus* being mostly confined to the lower country; but both are, in most localities, found together. At Charleston, *atratus* is by far the most numerous; at Columbia the

reverse is the case The two kinds associate freely together, upon terms of perfect accord, and, as they often circle about in each other's company, the observer has an excellent opportunity of noticing the radical differences which exist in their mode of flight, and in the outline of the body and wings.

PULLASTRÆ.

Fam. 30. — COLUMBIDÆ.

168. **Chamæpelia passerina.* Ground Dove. Res.; but mainly confined to the lower country. I have never seen it as far inland as Columbia.

169. *Zenœdura carolinensis.* Turtle Dove. Res.; very ab.

170. *Ectopistes migratorius.* Wild Pigeon. Of irregular occurrence.

GALLINÆ.

Fam. 31. — MELEAGRIDIDÆ.

171. *Meleagris gallopavo.* Wild Turkey. Res.; and still common in certain sections.

Fam. 32. — TETRAONIDÆ.

172. *Bonasa umbellus.* Ruffed Grouse. Res. (G.)

Fam. 33. — PERDICIDÆ.

173. *Ortyx virginianus.* Quail. "Partridge." Res.; very ab.

GRALLÆ.

Fam. 34. — CHARADRIIDÆ.

174. *Charadrius virginicus.* Golden Plover. Win.; chiefly during its migr.

175. *Squatarola helvetica.* Black-bellied Plover. Win.; chiefly during its migr.

176. *Aegialitis vociferus.* Killdeer Plover. Res.; but most numerous during its migr. This species migrates chiefly by night; and,

particularly in April, when passing north, its loud cries constantly break the stillness of the night.

177. *A. Wilsoni.* Wilson's Plover. Res. This is essentially a Southern species; but many reach, in summer, the coast of the Middle States, and some stray into New England. Exclusively maritime.

178. *A. semipalmatus.* Ring Plover. Win.; from Sept. to Apr.; com. on the coast.

179. *A. melodus.* Piping Plover. As the preceding.

Fam. 35. — HÆMATOPODIDÆ.

180. *Hæmatopus palliatus.* Oyster-Catcher. Win. (G.) Only on the coast.

181. *Strepsilas interpres.* Turnstone. Win. (G.) Only on the coast.

Fam. 36. — SCOLOPACIDÆ.

182. *Philohela americana.* Woodcock. Res.

183. *Gallinago Wilsoni.* Snipe. Win., but most numerous in spring and fall.

184. *Macrorhamphus griseus.* Red-breasted Snipe. As the preceding. *M. scolopaceus* probably also occurs.

185. *Tringa canutus.* Knot. Coast in win.; not ab.

186. *Calidris arenaria.* Sanderling. Coast in winter.

187. *Ancylocheilus subarquata.* Curlew Sandpiper. (G.)

188. *Micropalama himantopus.* Stilt Sandpiper. (G.)

I have no personal knowledge of the occurrence of these two species; both are given by Prof. Gibbes without comment. They are probably rare winter visitors.

189. *Pelidna americana.* American Dunlin. Coast in win.

190. *Ereunetes pusillus.* Semipalmated Sandpiper. Coast in win.

191. *Actodromas maculata.* Grass Snipe. Win.

192. *A. Bonapartei.* ("*Tringa Schinzii*" of Gibbes' list) White-rumped Sandpiper. Coast in win.

193. *A. minutilla.* Least Sandpiper. Win.

These four species are most numerous during the migrations which take place in Apr. and Sept.—Oct.

194. *Symphemia semipalmata.* Willet. Res.

195. *Gambetta flavipes.* Yellow-legged Tatler. Win.

196. *G. melanoleuca.* Tell-tale. Win.

197. *Rhyacophilus solitarius.* Solitary Tatler. Migr.; perhaps win. Prof. Gibbes gives it as resident; this I scarcely credit.

198. *Tringoides macularius.* Spotted Sandpiper. Res.; but the greater number pass N. to breed.

199. *Actiturus Bartramius.* Bartramian Sandpiper. Migr.

200. *Tryngites rufescens.* Buff-breasted Sandpiper. Migr.

201. *Limosa hudsonica.* Hudsonian Godwit. Win.

202. *L. fedoa.* Marbled Godwit. Win.

203. *Numenius hudsonicus.* Hudsonian Curlew. Win.

204. *N. borealis.* Esquimaux Curlew. Win.

205. *N. longirostris.* Long-billed Curlew. Res.

Three species of *Phalarope* may be expected to occur in winter, but I have no authority for their insertion.

Fam. 37. — RECURVIROSTRIDÆ.

206. *Recurvirostra Americana.* Avoset. Res.?

207. *Himantopus nigricollis.* Stilt. Sum. (G.)

Fam. 38. — GRUIDÆ.

208. *Grus americanus.* Whooping Crane. Win. (G.)

Fam. 39. — ARDEIDÆ.

209. *Demiegretta ludoviciana.* Louisiana Heron. Sum.

210. *Garzetta candidissima.* Little White Heron. Sum.

211. *Florida cærulea.* Little Blue Heron. Sum. This species is more generally distributed than the preceding, not being confined to the lower country. It is the commonest heron about Columbia toward the close of summer.

212. *Ardea herodias.* Great Blue Heron. Res.; com.

213. *Herodias egretta.* Great White Heron. Sum.; com. in the lower country.

214. *Ardetta exilis.* Least Heron. Res.

215. *Botaurus lentiginosus.* Bittern. Win.; probably res.

216. *Butorides virescens.* Green Heron. Sum.; perhaps res.

217. *Nyctiardea gardeni.* Night Heron. Sum.

218. *Nycherodius violaceus.* Yellow-crowned Heron. Sum.

Fam. 40. — TANTALIDÆ.

219. *Tantalus loculator.* Wood Ibis. Res.

220. *Ibis Ordii.* Glossy Ibis. Sum.

221. *Ibis alba.* White Ibis. Sum.

The *Tantalidæ* are confined to the lower country.

Fam. 41. — PLATALEIDÆ.

222. *Platalea ajaja.* Roseate Spoonbill. Sum. (G.)

Fam. 42. — RALLIDÆ.

223. *Rallus elegans.* Fresh Marsh Hen. Res.

224. *R. crepitans.* Salt Marsh Hen. Res.

225. *R. virginianus.* Virginia Rail. "Res." (G.), but chiefly in spring and fall.

226. *Porzana carolina.* Sora Rail. Migr.; very ab.

227. *P. noveboracensis.* Yellow Rail. Migr.

228. **P. jamaicensis.* Black Rail. Sum. This is essentially a Southern species, but sometimes strays at least as far north as Washington, D. C. (See Coues and Prentiss, Smiths. Rep. 1861, p. 416.)

229. *Gallinula galeata.* Gallinule. Res.

230. *G. martinica.* Purple Gallinule. Res.

This and the preceding species sometimes stray into the Middle States, and even to New England.

231. *Fulica americana.* Coot. Win.; very com.

Fam. 43. — PHÆNICOPTERIDÆ.

232. *Phœnicopterus ruber.* Flamingo. Rare or accidental, in summer? Inserted on Prof. Gibbes' authority.

LAMELLIROSTRES.

Fam. 44. — ANATIDÆ.

233. *Cygnus americanus.* Swan. Coast in win. Prof. Gibbes gives "*C. buccinator*, sum."; but presumably upon erroneous data.

234. *Anser hyperboreus.* Snow Goose.

235. *A. Gambeli.* White-fronted Goose.

236. *Bernicla canadensis.* Wild Goose.

237. *B. brenta.* Brant Goose.

These geese occur in winter, chiefly along the coast. *A. cœrulescens* may very likely be also found. Prof. Gibbes gives the Canada Goose as summering.

238. *Anas boschas.* Mallard.
239. *A. obscura.* Black Duck.
240. *Dafila acuta.* Pintail.
241. *Nettion carolinensis.* Green-winged Teal.
242. *Querquedula discors.* Blue-winged Teal.
243. *Spatula clypeata.* Shoveller.
244. *Chaulelasmus streperus.* Gadwall.
245. *Mareca americana.* Widgeon.

These *Anatinæ* are all winter visitants, both in the interior and along the coast, arriving in Oct., upon an average, and remaining until April. Most of them are abundant; the Mallards and Widgeons especially so; the Shovellers and Black Ducks are less numerous.

246. *Aix sponsa.* Summer Duck. Res.; ab.
247. *Fulix marila.* Big Black-head.
248. *F. affinis.* Little Black-head.
249. *F. collaris.* Ring-neck.
250. *Aythya americana.* Red-head.
251. *A. vallisneria.* Canvas-back.
252. *Bucephala americana.* Golden-eye.
253. *B. albeola.* Buffle-head.
254. *Harelda glacialis.* South Southerly.
255. *Pelionetta perspicillata.* Surf Duck.
256. *Oidemia americana.* Scoter.
257. *Melanetta velvetina.* Velvet Duck.

These *Fuligulinæ* occur only in winter; the first seven are of common and regular occurrence; the last four are rare or casual so far South.

258. *Erismatura rubida.* Ruddy Duck. Coast in win.
259. *Mergus americanus.* Sheldrake. Coast in win.
260. *M. serrator.* Merganser. Coast in win.
261. *Lophodytes cucullatus.* Hooded Merganser. Coast in win.

STEGANOPODES.

Fam 45. — Pelecanidæ.

262. *Pelecanus erythrorhynchus.* White Pelican. "Win." (G.)
263. *P. fuscus.* Brown Pelican. Res. (G.)

Fam. 46. — SULIDÆ.

264. *Sula bassana.* Gannet. Win. (G.)
265. *S. fusca.* Booby. Res. (G.)

Fam. 47.— TACHYPETIDÆ.

266. *Tachypetes aquilus.* Frigate Bird. Sum. (G.)

Fam. 48. — PHALACROCORACIDÆ.

267. *Graculus dilophus.* Double-crested Cormorant. Coast in win. Perhaps also *G. floridanus.*

Fam. 49. — PLOTIDÆ.

268. **Plotus anhinga.* Snake Bird. Sum. (G.)

LONGIPENNES.

Fam. 50. — PROCELLARIIDÆ.

269. *Æstrelata hæsitata.* (*Procellaria meridionalis* Lawr.) This species must certainly occur off the coast, as it goes as far north as New York.
270. *Oceanites oceanica.* Wilson's Stormy Petrel. Off the coast.
271. *Puffinus major.* Greater Shearwater. Off the coast.
272. **P. obscurus.* Dusky Shearwater. Off the coast. Sum. (G.)

Fam. 51. — LARIDÆ.

273. *Larus marinus.* Black-backed Gull. Coast in win.
274. *L. delawarensis.* Ring-billed Gull. Coast in win.
275. *L. smithsonianus.* Herring Gull. Coast in win.
276. *Chræocephalus atricilla.* Laughing Gull. Coast in sum.
277. *C. philadelphia.* Bonaparte's Gull. Coast in win.
278. *Gelochelidon anglica.* Marsh Tern. Sum.
279. *Sterna hirundo.* Common Tern. "Sum." (G.)
280. *S. Forsteri.* ("*S. Havelli*, Aud.," of Gibbes' list.) Win.
281. *S. antillarum.* Least Tern. Migr.; sum.?
282. *S. paradisea.* Roseate Tern. Coast in sum.
283. *Thalasseus acuflavidus.* Cabot's Tern. Migr. ?
284. *T. regius.* Royal Tern. Coast in sum.

285. *Hydrochelidon fissipes.* Black Tern. Sum.
286. *Rhynchops nigra.* Black Skimmer. Coast in sum.

PYGOPODES.

Fam. 52. — Colymbidæ.

287. *Colymbus torquatus.* Loon. Win.
288. *C. septentrionalis.* Red-throated Diver. Win.
289. *C. arcticus.* Black-throated Diver. Win. (G.)

Fam. 53. — Podicipidæ.

290. *Podiceps holboëlli.* American Red-necked Grebe. Win.
291. *P. cristatus.* Crested Grebe. Win.
292. *P. cornutus.* Horned Grebe. Win.
293. *Podilymbus podiceps.* Dabchick. Win.

Fam. 54. — Alcidæ.

294. *Pratercula arctica.* Puffin. Win. (G.) I insert this species on Prof. Gibbes' authority; but South Carolina is much beyond its ordinary range.

D. G. Elliot. Esq.
With the author's regard

[From the American Naturalist, December, 1868.]

BIRD'S-EYE VIEWS.

BY DR. ELLIOTT COUES, U. S. A.

Birds alone, of all animate beings, may be truly said to "fall asleep" in death. When the silver cord of a bird's life is loosened, the "windows of the soul" are gently closed by unseen hands, that the mysterious rites attending the divorce of the spirit from the body may not be profaned by prying looks. With us, the first office rendered by sorrowing friends to one departed, is to close the eyes, to hide from view the mockery of life that looks out from between motionless lids. And when any mammal expires, the eyes remain wide open. With all, the stony stare of the glazed ball is the sign of dissolution. Only birds close their eyes in dying.

This is one of the differences between birds and mammals. Beautiful and wonderful as birds are in this respect, which comes to the reflective mind fraught with significance, we shall find them scarcely less beautiful and wonderful even as regards the material, physical structure of their eyes. Let us look into a bird's eye. Though the flash and glow of life be gone, and only dead tissues left, we shall still find more than we can fully comprehend, and everything that we see will excite interest and admiration.

To commence by saying that all birds have eyes, might appear at first sight to be superfluous. Yet this statement expresses one of the characters of the class *Aves;* for it is not applicable, without some qualification, to any other class of Vertebrates. Some representatives of each of the other classes either have no eyes at all or else very rudimentary ones. There are blind fishes and blind reptiles; and there are mammals at least "as blind as a mole." Among birds, the "wingless" species of New Zealand (*Apteryx*) are said to have the smallest eyes of all, and also to want one of the most characteristic structures of the avian eye-type,—the marsupium, a peculiar organ inside the eye, of which we shall learn something before we have finished our "Views."

We will examine first the accessory structures of a bird's eye,—those that surround and defend it, produce its movements, and keep it in working order; and then we will look at the more exquisite mechanism within.

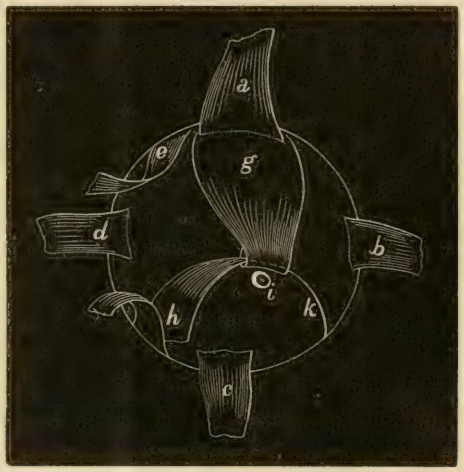
If we hold a dying bird in our hands, we observe that just as the last convulsive shiver agitates its frame, the eyes close by the uprising of the lower lid. In the primitive theatres of classic days, the curtain was lowered from the top to disclose the stage, and drawn up when the act was over; now these movements are reversed. Birds follow the classic usage, when the curtain rises upon the last scene of their life. Here at the outset is one difference between the eye of a bird and that of a mammal; and differences will multiply as we proceed.

The movements of the upper lid, in almost all birds, are much more restricted than those of the lower. There are few exceptions to this rule, and these chiefly furnished by the nocturnal raptores (*Owls*, *Strigidæ*), and certain fissirostres (*Caprimulgidæ*, e. g., Whippoorwill, Night-hawk). Both lids are composed of common skin externally, a membrane internally (the palpebral part of the conjunctiva, to be noticed presently), with a layer of fibrous tissue interposed for greater strength. Besides these tissues, the lower lid

has also a smooth oval plate of cartilage to stiffen it. The upper one is raised by a very small muscle, called *levator palpebræ superioris*, arising from the rim of the bony orbit, and running to the edge of the lid. There is no special lowering muscle; it is depressed by the action of part of another muscle, the *orbicularis oculi*, that nearly surrounds the eye, the chief office of which is to pull up the lower lid. The latter has a small distinct muscle for its depression.

A bird's eye, when wide open, appears almost perfectly circular; there are no well marked corners or angles (*canthi*) in front or behind, as in man and most mammals. Birds have no true eyelashes, but some kinds have two series of short modified feathers along the edges of the eyelids, that may be considered to correspond to the hairs found in this situation in mammalia.

Fig. 1.*



Now let us separate the lids and look at the eye. Not yet! "In the twinkling of an eye" a third lid is disclosed inside the other two, throwing a veil over the ball. This third inner eyelid is the nictitating membrane (*membrana nictitans*), a very curious structure, both in its movements and functions. It is a very thin, delicate, elastic membrane, transparent, or nearly so, of a delicate pearly-white color. While the other two lids move vertically, and have a hori-

*Fig. 1, right eyeball, seen from behind, showing the muscles. *a*, rectus superior; *b*, rectus externus; *c*, rectus inferior; *d*, rectus internus; *e*, obliquus superior; *f*, obliquus inferior; *g*, quadratus; *h*, pyramidalis, with its tendon, *k*, passing through pulley in quadratus (as shown by dotted line) to keep it from pressing on optic nerve *i*, then running to the edge of the ball, around which it passes.

zontal commissure, this one sweeps horizontally, or a little obliquely across the front of the ball, from the side next the beak to the outer one. When not in action, it lies curled up in the lower anterior corner of the orbit: when wanted for use it is pulled over the eye by the action of two muscles that grow on the back of the ball. The mechanism of its movements—the most perfect and ingenious that could be imagined—may be clearly understood with the help of the figure on the preceding page, which represents the back of the right eyeball, with all its muscles. Two of these act upon the nictitating membrane alone; *g* is the *quadratus* muscle, so called from its somewhat squarish shape, arising at the upper margin of the ball, and extending down on the ball to the optic nerve, *i*, where it ends in a broad flat transverse tendon, not attached to anything, but perforated so as to form a sheath or loop; *h* is the *pyramidalis* muscle, also so-called from its shape, tapering into a very long thread-like tendon, *k*, that first runs through the pulley-like sheath in the tendon of the quadratus, and then curves downwards and backwards over the ball, to the margin of the latter. It winds around, gets in front of the ball, and goes to be inserted into the lower corner of the nictitating membrane. If this slender tendon went straight along to the margin of the ball, and across the front, it would be right in the line of vision when the nictitating membrane, retiring to its corner, pulled it after. If it went directly under the ball to get to the front, it would not have the right direction to draw the membrane straight across the eye. So it must wind around the optic nerve. But now it would press upon, and interfere with the all-important functions of, the nerve, if there were no provision for keeping it away from the nerve when the pyramidalis exerts its force of traction. Here the quadrate muscle comes into beautiful action; it always contracts simultaneously with the pyramidal, and carries the tendon of the latter up out of the way of the nerve. Such is the ingenious, concerted action, of these two muscles,

which, though contracting in opposite directions, and mutually antagonistic as far as the nerve is concerned, eventually exert their force in the same direction, and work harmoniously for a common purpose. When the tendon of the pyramidalis is loosened by relaxation of the two muscles, the nictitating membrane is set free, and returns to its hiding-place by virtue of its own elasticity, just as the curtain of a coach window, after being forcibly drawn down, rolls itself up again when the lever that sets a spring in action is moved.

We understand the mechanism of the nictitating membrane better than we do its use. Birds can wink with this one eyelid alone, as might be expected from its name, wherein they beat mammals, that cannot wink without moving both lids. If we menace a bird's eye with the finger, we see that the nictitating is the first of the lids to rush to its defence. But the membrane is believed to be chiefly subservient to regulating the amount of light to be admitted to the eye. The eagle is, probably, able to soar aloft directly in the sun's rays, by drawing this covering over its eyes. Owls habitually sit, in the daytime, with drawn curtains to shut out the glare of light. It is also quite possible that many, or most birds that are rapid flyers, make great use of this membrane in guarding against various dangers to which the eye would be exposed in their dashing career. A screen is placed before the eye, which, while not preventing sight, as closure of the outer lids would, opposes the entrance of any particles of matter.

Three lids of the casket that holds the gem have been raised, and yet there is still another covering of the jewel within. A very delicate filmy membrane, not very apparent on ordinary inspection, is laid over the front of the ball, from around which it is reflected over on to the inside of the two outer lids. This is the *conjunctiva*, so-called because it joins the lids to the ball. It is a highly vascular tissue, with numerous tortuous blood-vessels ramifying all through it.

When these vessels become engorged with blood, as occurs in congestion or inflammation of the conjunctiva, they are very distinctly seen, and we have the state of things that is called "blood-shot."

Before examining the eyeball, which at length we have reached, let us glance at some accessory structures that are found lying with it in the socket. Properly speaking, birds cannot be said to cry; their features are immobile, and cannot wear an expression of grief; but they can shed tears. The tears are elaborated by two small glands that lie inside the eyelids, one in each corner. These are both "lachrymal" glands; but the one that lies in the corner next the beak is called the "Harderian gland." It is smaller than the other, nodulated in shape, and deeply seated inside the nictitating membrane, upon which it pours out a viscid or glairy secretion through a small opening, the mouth of a short duct that receives branches from all parts of the gland. The nictitating membrane requires constant oiling to work easily; the Harderian gland is an oil-can that can both make the oil and apply it when needed. The other, more truly a lachrymal, or "tear" gland, pours its secretion into the posterior or outer corner of the eye, near the juncture of the two outer lids, which are thus kept soft and moist on the inside. Tears, in the concrete, viewed anatomically or physiologically, are very different things from tears regarded abstractly as to their æsthetic relations; at any rate, they subserve a much more useful and sensible purpose. The "lachrymal duct," which is neither more or less than a drainage-tube for the eye, to carry off superabundant tears, or tears that have fulfilled their function and are worn out, commences by two little openings in the anterior lower corner of the eye, and runs into the nose, which is thus made a cesspool to receive the refuse waters of the eye. There is, beside the two above-mentioned, a third gland about the eye, very large and conspicuous in some birds, as the loons, albatrosses, and other swimmers, in which it is lodged in a

deep semilunar groove in the roof of the bony orbit. But it does not belong to the eye at all, and seems to be stowed there for want of room elsewhere. Its long duct runs along the top of the orbit into the nose, pouring out a secretion that lubricates the mucous membrane (*pituitary* membrane) of the nasal passages.

The lachrymal glands keep the eye's face clean, and relate chiefly, if not wholly, to the movements of the eyelid. The eyeball itself rolls about by the indirect aid of a different tissue—the *areolar*, or *cellular*, as it is indifferently called,—the interstices of which are filled with fat. Ordinarily, the socket of an eye is much too large for the ball, and of a conical, instead of globular shape, so that the ball can no more fit or fill it, than can a marble dropped into a candle extinguisher. A bird's eyeball is more nearly fitted to its socket than that of most mammals; still, it rests wholly or in great part upon a bed of fat. This soft, yielding, elastic substance gently presses the eye forwards, and holds it there in place, accurately adapted to the lids, while at the same time it allows the ball to rotate any way upon its own axis, and also keeps it greased. We have a great deal of fat in our own eye-sockets in health. The reason that people's eyes are sunken or "hollow" after a long illness, is because part of it is wasted away. While there is so much fat all around the eyeball, there is not a particle in the eye itself; this comparatively clumsy and stupid material would be like a bull in a china-shop in such a nervous quick-witted structure.

Ducks are said to roll their eyes up in a thunder-storm, and very likely they do, since all birds move their eyes about more or less when they are not asleep. But the amount and degree of motion that a bird's eye is capable of is small in comparison with that enjoyed by most mammals' eyes. This results partly from the shape of the orbit, and partly from the shape of the ball itself, which last is very singular, as we shall see in the sequel. Nevertheless, there are as many

muscles in a bird's eye as in a mammal's. They are six in number; whereof four are called "straight" muscles (*recti*) and two "oblique" (*obliqui*); though for the matter of that, they are all of them straight enough. The terms refer to their line of traction. The four recti all arise near each other, at the back of the bony orbit, around the hole (*foramen opticum*) that lets the optic nerve in from the brain; and go to be inserted into the eyeball at four nearly equidistant points around its margin. One (*musculus rectus superior*, *a*, in Fig. 1) goes to the top; another (*m. r. inferior*, *c*) to the bottom, antagonizing the first; the other two (*mm. r. internus*, *d*, *and externus*, *b*) respectively to the front and rear (or to what would be the inner and outer sides, if a bird's eye were directed forwards like ours), and also antagonize each other. The two oblique muscles arise farther forward in the bony orbit, near each other, and then diverge, one (*m. obliquus superior*, *e*) going obliquely upward, the other (*m. o. inferior*, *f*), obliquely downward: they are inserted near the margin of the globe, close by the insertions, respectively, of the upper and under recti muscles. Their action appears to be very limited: the most notable thing about them is that the superior one goes straight from its origin to its insertion, whereas in mammals this muscle changes its direction almost at a right angle, by passing through a fibrous loop, forming a pulley, suspended from the inner upper corner of the orbit, very much as the tendon of the pyramidalis changes its course by running through the sheath in the quadratus. The six muscles serve as so many ropes to pull the eye in different directions, and change the axis of vision; and all taken together, as stays to steady it. In the figure they are cut away from their origins at the bony orbit, and reflected away from the eyeball, to give a fair view of the pyramidalis and quadratus. The reader must mentally collect the six dangling ends, and fasten them in the places above designated.

There are some other structures in the socket of the eye,

besides those already described, and the ball itself. There are nerves, arteries and veins. Of the first named, the optic, or sight-nerve, is by far the largest, and is in fact the only one that can be discerned without more trouble than most persons would be willing to take to see it, and more skilful dissection than most can make. It is described further on, as it can be more conveniently studied in connection with the ball itself. Other nerves go to the muscles of the eye. The *oculo-motor* divides into numerous branches, which are distributed to the inferior oblique, and all the recti except the external. The latter claims a nerve of its own (the *abducens*), and so, also, does the superior oblique, to which the *patheticus* is exclusively distributed. These nerves all come directly from the brain. We do not know why they are so unequally distributed. There are some more nerves in the socket which, however, do not particularly concern the eye, and therefore need not concern us. There is little to be said of the blood-vessels: they ramify everywhere, supplying all the structures of the eye with food. The arteries bring the nutritious fluid, and the veins carry it away when the nourishment has been extracted for the repair of the destruction that constantly goes on in all living tissue, and when it has become loaded with carbon, and other effete or deleterious matter.

So much for the surroundings of a bird's eye,—the setting of the precious stone: now we are prepared to look inside. An eye is a perfect microcosm, in which we find almost every kind of tissue that enters into the composition of the rest of the body. If the reader's interest has been awakened, as we hope it has, by what has gone before, we can, with confidence, invite him to look deeper into a bird's eye, and give him assurance that a far more beautiful "View" will be presented to him.—*To be concluded.*

BIRD'S-EYE VIEWS.

BY DR. ELLIOTT COUES, U. S. A.

(Concluded from page 513.)

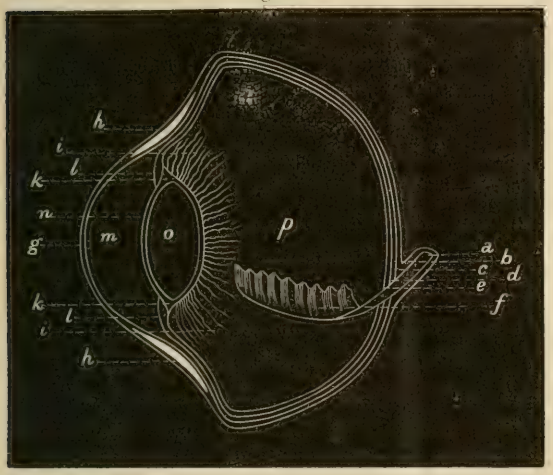
In our last "View" we saw all the appendages of a bird's eye; and now we come to look at the eye itself. "Eye-ball" and "globe of the eye" are very convenient terms, constantly in our mouths; but they are not strictly accurate ones. Probably there are no perfectly spherical eyes. In our own species, the eye is made up of a segment of a large sphere, representing about five-sixths of its superficies; the other sixth is a smaller segment of a small sphere, joined in front to the former. Most mammal's eyes are not very different in this respect from our own. Bird's eyes are much further removed from perfect sphericity. The greater part of the ball is saucer-shaped,—almost discoidal; and there is a very convex prominence, more or less hemispherical in shape, in front. The whole eye may be likened to an acorn of one of those oaks that bear a fruit with a heavy broad shallow cup, and short blunt kernel, or to a thick old-fashioned watch with a very-convex crystal.

This shape is one of the distinguishing characters of a bird's eye: the figure (Fig. 2) will give a better idea of it than any description. It represents a vertical section through the middle of an eye in profile, and shows nearly all the structures and organs that be demonstrated in the ball. Before making use of it, however, the reader must be reminded of the two following points: First, the distinctness of the several membranes forming the ball is greatly exaggerated; for otherwise the different membranes could not be represented as such. Secondly, the ciliary processes, optic nerve, and marsupium, do not fall wholly within the line of a vertical section; they lie curving obliquely against the inside of the walls of the hollow spheroid. But no idea whatever

could be gained of them, were they merely represented at the isolated points where they cross the vertical plane; and they are therefore introduced somewhat artificially. The sacrifice of theoretical accuracy is more than compensated for by increased perspicuity.

Recollecting that the "eyeball"—as we shall continue to call it for convenience sake—is filled with fluid that presses equally in every direction, we cannot at first make out how its peculiar shape is maintained. But the reason why the ball does not assume a spherical shape really is plain enough when we come to dissect its coats. They are partly *bony*. They are splinted, as it were, with the bones (*h*, *h*) that are packed alongside each other all around the circumference of one part of the ball.

Fig. 2.*



The large discoidal segment of a bird's eye is mostly made up of a membrane called the *sclerotic*, from its hard, dense structure. It is a thick, strong, tough membrane, of a glistening livid, or grayish blue color. Three sclerotic coats or layers, differing from each other a little in texture, may be demonstrated by careful dissection, though on super-

Fig. 2.* Vertical antero-posterior section through middle of eyeball. *a*, optic nerve; *b*, sclerotic, outer coat; *c*, sclerotic, middle and inner coats; *d*, choroid; *e*, hyaloid; *f*, marsupium; *g*, cornea; *h*, *h*, bony plates between layers of sclerotic; *i*, *i*, corrugations of choroid, forming the ciliary processes; *k*, *k*, canal of Petit; *l*, *l*, iris; *m*, anterior chamber; *n*, capsule of lens; *o*, lens; *p*, posterior chamber. Neither the retina, nor the peculiar sheathing of the optic nerve, is shown. The nerve, the marsupium, and the ciliary processes, do not wholly fall within a vertical section through the middle of the eye, and cannot be represented in this figure except artificially.

ficial examination the sclerotic presents itself as a single homogeneous tissue. In the figure (*b*) is the outer coat, and (*c*) the middle and inner ones combined. The osseous plates just mentioned lie between the outer and middle sclerotic coats, anterior to the greatest circumference of the eyeball, and nearly or quite extend from the rim of the disk to the edge of the central anterior transparent part of the ball—the *cornea*. They are fifteen or twenty in number, of an oblong, quadrate shape, broader behind, tapering toward the cornea, and so disposed as to form a complete bony circlet around the latter. Collectively, they enjoy some little motion, their anterior margins advancing and receding with the varying convexity of the cornea; but they cannot individually wabble, being firmly bound to each other by the continuation of the sclerotic coats between them.

The *cornea* (*g*) is the thin transparent membrane in front that the bird looks through. It forms the anterior part of the wall of the eye, and is, in one sense, a continuation of the sclerotic; but its texture is very different from that of the latter. It is the prominent convex part of the eye,—the hemisphere of the small globe that has been already mentioned. Its structure offers nothing peculiar, being essentially the same as in mammals; but its shape is remarkable. Always very convex, it is sometimes still more protuberant, being elongated into a sort of cylinder, with a hemispherical top. This tubulation is very great, for example, in the nocturnal birds of prey (Owls, *Strigidæ*). The alteration of shape that the cornea is capable of is next most singular, as will be explained when we come to speak of the powers of the eye as a whole. It is sufficient here to bear in mind the unusual shape of the cornea, and its power of increasing and diminishing its convexity.

The sclerotic coat is lined inside with a membrane of very different tissue—the *choroid* (*d*). While the former is tough and fibrous, with comparatively few blood-vessels, the latter is more loosely woven of cellular tissue, replete with

interlacing blood-vessels, and painted pitch-black all over. The deposit of pigmentary or black coloring matter is very heavy, and serves to absorb those rays of light not needed in vision. The choroid membrane lines all the inside of the eye as far forward as the edges of the bony plates, where it splits into two layers. The *inner* of these turns away from the wall of the ball, towards the axis or middle line of the eye, and in so doing becomes gathered in plicæ, or folds, much as the top of a bag is wrinkled by pulling the string. These radiating folds come from all around, to collect together upon the rim of the crystalline lens (*o*), or rather of the delicate capsule (*n*) that encloses the lens, and adhere there. Their terminations form what are called the *ciliary processes* (*i*, *i*). The *outer* layer also curls away from the sclerotic, and starts to go transversely across the eyeball, but ends at once in the iris.

The *iris* (*l*, *l*) is the most exquisitely beautiful structure in a bird's eye. It is the many-colored curtain that hangs vertically between the two apartments of the eye. It is the highly ornamented framework of the window of the eye, uniting the offices of sash and blind. The crystalline lens is suspended in the round hole punched in the centre of the iris. Viewed in front, from the outside, the iris appears as a colored circular band around the pupil. It seems to lie directly on the surface. But this is not so, for the cornea and its humors are between us and it. It is like the dial-plate of a watch, that we look straight at without noticing the crystal that is interposed. The central aperture through which come the shafts that the hands are fastened to, may be likened to the pupil. Everybody knows what the "pupil" is, in a vague way. It is the round black spot inside the colored rim of the iris; but few understand what the spot is. The difficulty is, that the pupil is regarded as a material thing—a tissue, structure, or organ—when it is not. It is the absence of matter. The round black spot called the pupil is not a "thing;" it is a hole in a thing,—the hole in

the iris through which we look (the transparent crystalline lens offering no obstruction to our view) directly into and across the posterior chamber of the eye, and see the black pigment on the choroid behind. Albino animals have pink eyes, because the coloring matter of the choroid is wanting, and the hue of the blood in its numerous fine vessels appears. And even if we look into a normal eye with the ophthalmoscope, we have a reddish instead of a black field of vision. The pupil takes its name from a very pretty conceit. On looking straight at it, our image is reflected to us, only so diminished that we are transformed into pigmies. We find an expression of the same thing in other languages beside our own. In Spanish, the liliputian photograph is called "niñacita del ojo;" which means "little eye-baby."

But to return from this digression to the iris, which has been all the time nervously quivering at our neglect. It is essentially similar in structure to the choroid, being a delicate tissue of fibres and vessels interlacing in every direction; but it has, in addition, a structure that is regarded as muscular. The iridian muscles are mainly disposed in two ways; there is a circular set running around, and a radiating set that pass across from the inner to the outer border. By means of these, which are mutually antagonistic, the iris is contracted and expanded, and its aperture—the pupil—correspondingly varied in size. In mammals, the movement of the iris appears to be automatic, and to depend upon the stimulus of light; and they are not so great, as a general rule, as in birds. In the latter, they are extraordinary, not only in degree, but in the rapidity with which they may be executed. Although birds' irides respond primarily, and perhaps chiefly, to the action of light, their movements seem to be partly, at least, subject to the will, and therefore voluntary. These conditions of mobility in the iris relate directly to such exigencies as, for examples, the owl meets with in the daytime, or the eagle encounters in his flight towards the sun.

The iris of birds is copiously supplied with coloring matter; the tints vary with different species, and are often extremely brilliant. Some shade of brown is, perhaps, the commonest color. Yellow is very common; red is often seen; blue and green are more rarely met with. The eyes of Cormorants are of the latter color. Sometimes the iris is blackish, or black, like the choroid; and it is frequently pure white, as in the instance of one of our common birds, the White-eyed Greenlet (*Vireo Novæboracensis*).

The *crystalline lens* (*o*) is a transparent bi-convex disk, just like a common magnifying glass. It apparently hangs on the iris like a looking-glass in its frame, but is really set a little further back. In birds, it is rather flatter, especially behind, and also softer in consistency, than in some other classes. It is enclosed in a very delicate transparent membrane, its *capsule* (*n*), which is in turn set in between two layers of a membrane, called "hyaline," to be presently described. Where the two hyaloid layers separate around the rim of the capsule, to form its case, a small space is left, that makes a circular tube all around, called the *canal of Petit* (*k*, *k*). The lens is stationary as far as the axis of vision is concerned; but is capable of being moved a little forwards and backwards, by the pressure of the humors of the eye, which is produced by the coöperative action of certain muscular and vascular structures, as we shall see before we get through. This movement adjusts the focus for vision, exactly as it is adjusted in a telescope, for instance, by lengthening or shortening the tube.

We can understand, now, that the eyeball is divided into two compartments, or "chambers," as they are called, by the inward reflection of the two choroid coats, the hyaloid, the iris, and the lens, which together form a vertical wall. Both of these chambers are filled with fluid, of different density and consistence in each. That in the anterior division is thin and watery, and therefore called the "aqueous humor;" that in the posterior one is more dense and glassy, and is for

this reason known as the "vitreous humor." There is much less aqueous than vitreous, because the anterior chamber is much the smaller of the two; but birds have more of the former, compared with the quantity of the latter, than mammals, because the size and convexity of the cornea is relatively greater. The aqueous humor is enclosed in a very delicate simple membrane, that cannot be demonstrated without difficulty. The vitreous is contained in a more palpable, as well as complex membrane—the *hyaloid* (*e*) —which, besides lining the interior of all the back part of the eye, and enclosing the lens as already described, sends thin laminæ, or layers, all through the vitreous humor, forming partitions that serve to steady the glassy waters.

We may next turn our attention to the optic nerve (*a*) that presents itself in the all-important character of the "soul of the eye." It has many peculiarities in birds; among them one that constitutes the most characteristic feature of the eye of these creatures. In mammals, as a general rule, the nerve is a smooth cylinder that comes straight to the sclerotic, near the middle behind, penetrates straight through the coats of the eyeball, and then spreads out on all sides to form a disk on the inside of the back of the eye. This circular saucer-like expansion is the *retina*—the sensitive nervous plate, or mirror, upon which images of things viewed are photographed, to be transmitted along the nerve to the brain, and there "perceived." Suppose the optic nerve to be an umbrella-handle, the retina would then be the umbrella, blown inside out by the wind. In birds the nerve acts very differently. In the first place, though it is cylindrical, it is not smooth; it has lengthwise folds and ridges. It is like a fluted column. It comes obliquely towards the eye, which it strikes at a point eccentric from the axis of the ball; and then, instead of at once piercing all the sclerotic coats, and expanding into a concavo-convex disk, it tapers gradually to a fine point. This elongated extremity runs still obliquely, downwards and forwards, in a deep groove in the sclerotic, that

would be a perfect sheath were it not split lengthwise. Through this slit, and through a corresponding one in the choroid membrane, a fold or fluting of the nerve rises up, finally attaining the inside of the eye. The retina spreads out from all along the sides and extremities of this fold.

Only one other structure remains to be described—the crowning anatomical peculiarity of a bird's eye. This is the *marsupium*, or *pecten* (*f*). Though attached at one end to the optic nerve, it is not a part of the nerve at all, nor composed of nervous tissue. It is a very vascular membrane, most like the choroid in texture, and likewise painted black. When fully extended, it is seen to be of an oblong or rectangular shape; when lying naturally *in situ*, it is much drawn up, and its sides are transversely wrinkled or plicated. It is suspended in the vitreous humor, running obliquely forwards a great part, or the whole of the way, from the end of the optic nerve to the crystalline lens. In the former case it appears attached anteriorly to some of the laminæ of the hyaline; in the latter to the capsule of the lens. Behind, it is always fastened to the optic nerve. It is called the "marsupium," because it does not in the least resemble a purse or pouch; and the "pecten" because it does not look anything like a comb. Anatomists have not agreed upon what to consider as the function of this organ, nor upon the *quo modo* of its operation. Some have thought that it absorbs the superfluous rays of light that must often enter the eye, because it is blackened with pigment. One who adhered to this belief went further, considering that, from its eccentric position, it absorbs mainly oblique rays, which being taken away, objects placed in direct rays may be more plainly perceived. Some, again, have regarded it, in consequence of its vascular structure, as the organ that secretes, or aids the choroid in secreting the vitreous humor; an additional apparatus being needed for the elaboration of this fluid, because it is used up so fast in the rapid and incessant movements of the eye. But the theory now generally ac-

cepted differs from all of these hypotheses, and makes out the marsupium to be an "erectile" organ. Although no muscular fibres have been shown to exist in it, yet it is probably capable of expansion and contraction much as if it were muscular. It is a highly vascular structure, as we have seen; and the increased or diminished turgidity of its numerous blood-vessels* would, of course, alter its dimensions. If it occupies a variable space in the vitreous humor, it must affect the position of the lens, and by this means change the focus of the eye. This seems to be the most satisfactory explanation, both of the design of the marsupium, and of the mode in which its design is carried out. In this view, the organ is marshalled with several others that we know contribute to the greatest physiological phenomenon of a bird's eye,—the rapid adjustment of focus.

As anatomists, we have examined the structure, and position, and appearance of the organs that make up a bird's eye. But our study would be to little purpose if it ended here with an inspection of dead tissues. We have seen some curious things that, perhaps, have afforded us gratification, which is well enough as far as it goes; but curiosity is only laudable when, disdaining amusement as an ulterior object, it is contented only with a higher aim,—instruction. We must look, as physiologists, at the operations of the eye, and the mode in which its functions are conducted and accomplished. All that has gone before is merely to prepare us to question intelligently the structures we have examined, and find out how they work.

Eyes are made to see with, of course; but *how* we see with our eyes nobody knows. No one can tell us *how* an

* It is not apparent, at first sight, whence the marsupium gets its numerous vessels, since it is not attached at all to the vascular membrane of the eye,—the choroid. Professor Owen remarks on this subject: "Branches of the ophthalmic artery, distinct from the vessels of the choroid, and homologous with the *arteria centralis retinæ*, enter the eye between the laminæ of the retina, along the whole extent of the oblique slit in the sclerotic and choroid), and immediately penetrate the folds of the marsupial membrane, upon which they form delicate ramifications." (Anatomy of Vertebrates, Vol. II, p. 139.)

image formed on the retina is conveyed to the brain, and transformed into a mental perception, capable of being thought about. This is inscrutable; it is here the part of wisdom to confess ignorance, and acknowledge bounds that human reason cannot overstep. Nor have we need here to go into the general optical laws applicable to vision; they are well known, and moreover relate no more to a bird's eye than to that of any other animal. What we want is to find out the *meaning* of the structural peculiarities by which a bird's eye differs from other eyes. What is the reason and the purpose of the three eyelids? of the shape of the ball? of the very abundant aqueous humor? of the movable lens? of the marsupium? the tapering nerve? What special relation do these and other features bear to the sense of sight in birds? In other words, why must a bird have just this sort of an eye to be able to see perfectly? Some of these questions can be satisfactorily answered; others not. Some we have already replied to as they arose in our mind involuntarily during our dissection. Thus the third lid gives a subdued light, without excluding light altogether; and also protects the eye, which could not be otherwise protected without closure of its outer opaque lids, and loss of sight altogether. The very convex and highly refractive cornea doubtless has some relation to a bird's ability to see straight ahead, though its eyes look directly sidewise.

Perhaps no reason has been assigned for the singular course and termination of the optic nerve. These have possibly no special optical relations; the cause may lie simply in the relative situations of the brain and eye, which are such, that the nerve would have to change its course abruptly to pierce directly through the sclerotic. We cannot see through a crooked tube, any more than we can shoot round a corner. Nerves are the railroads of thought. A train of thought might run off the track if the curves and grades were not easy. I believe that we find comparatively few instances of abrupt angles in the course of nerves. If

we consider the marsupium as an erectile organ, we are not content to understand how it erects itself, and what it accomplishes by erection; we want to know why it is necessary or desirable that it should do what it does.

Putting together all that we do know of the operation of a bird's eye; and from this inferring some things that we do not know, we are irresistably led to the conclusion, that all the essential peculiarities of a bird's eye conspire to produce what we just now called its greatest physiological phenomenon—*instantaneous unerring adjustment of focus.*

Study of the habits of birds makes the necessity of some such faculty as this as evident as the fact of its existence. This admirable provision relates in the most direct manner possible to the rapid movements of birds in the air. As they dash onward in their airy course, the eye accommodates itself, if not with the speed of thought, at least with the speed of flight, to ever-varying distances, and surrounding objects, be they far or near, all alike rush into focus. With our own eyes, we see at once a book before us, and a large object in the distance. Push the book away by degrees; the letters run into words, words into lines, lines into paragraphs, paragraphs into a solid page of dark, surrounded by a white border; then the edges of the cover gain a film, the outlines soften, the thing becomes a spot, and finally disappears. If a bird were in our place, it would still see letters long after they had disappeared from our view. Its eye would change in shape, and the structures within alter in position, as the book moved off, slowly, gradually, constantly, till the limit of its power was reached; and this limit it need not be said, far exceeds ours. Walk towards the large object now indistinct in the distance. How long we are in approaching it: how very slowly it takes form as we advance, until it stands forth clearly in view! Let a wild duck fly at the rate of ninety miles an hour, towards the same object. How rapid must be the adjustment of its eyes compared with ours! But these are among the

moderate exhibitions of a bird's visual powers. Watch a Humming-bird: it darts away so swiftly that our eyes cannot follow it, and settles, light as a feather, upon a twig. We do not know how far off it discovered the twig; but, at whatever distance it was first brought into focus, the Humming-bird's eye adjusted itself during the fraction of a second that the bird was flying; and the twig was in focus at the instant the bird alighted upon it. Were we to move with the same velocity, our eyes would fail us; they could not accommodate themselves quick enough. See a Sparrow-hawk dash through a thick clump of bushes in headlong pursuit of its prey. Think you it rushes blindly, taking the chances of escaping the close-set obstacles in its way? It sees each stake and branch as it comes on, and avoids them all. Had we a Sparrow-hawk's power of flight we could not follow him for want of his powers of vision.

Observe an eagle circling in the air. He is soaring aloft higher and higher, till he becomes, to us, but a speck against the blue expanse. As he turns towards the sun, a signal is made, and quick as thought obedient servants obey the summons. The nictitating membrane, asleep in its corner, starts up and spreads over the cornea in an instant: the quivering iris, ever on the alert, enfolds the crystalline lens in a close embrace; and the tranquility of the retina is undisturbed. As he turns away, the enemy no longer harasses, and the guards retire. Now the great bird prepares to scan the ground below. His eye lies loosely in its socket; the muscles relax; the marsupium lies torpid; the lens falls back; the cornea sinks; the waters retire; all are quiet. The retina alone glows and thrills with excitement. He is now far-sighted; he descries an object on the earth smaller than himself, even from this vast height; and makes ready for the fearful plunge. He poises a moment; the word is given; as trusty sailors to their posts to save the good ship in a storm, so rush the sentinels of the eye into action. Down he swoops; the muscles tauten, and the waters rush forward;

the cornea feels the pressure within, and starts out; the marsupium stands erect, swelling and bristling all over, and the lens leaps forward, while the iris flaunts the flag of battle. Guided by such an instrument as this, the bird comes down with unerring aim upon his quarry; he seizes it in his talons; and now, become near sighted, well can he see to perform the bloody work before him.

There is, perhaps, as much to be seen in a view of a bird's eye, as ever lies within the bounds of a "bird's-eye view."

With the Author's Compliments

[From the Proceedings of the Academy of Natural Sciences of Philadelphia, Jan., 1868.]

A MONOGRAPH

OF

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BY

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(ASS'T. SURGEON U. S. ARMY.)

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A Monograph of the ALCIDÆ.

BY ELLIOTT COUES, A.M., M.D.

Assistant Surgeon United States Army.

"Hinc bonus Moehringivs, boni Brissonivs, Kleinivs, Linnaé cet. sed in medio in omnes veritas et Naturæ ordo!"—*Pallas.*

The *Alcidæ* contained in the collections of the Smithsonian Institution, Washington; the Academy of Natural Sciences, Philadelphia; the Society of Natural History, Boston; the Essex Institute, Salem; and in the private cabinet of Mr. Geo. N. Lawrence, of New York, have been examined in the preparation of the present memoir. The writer tenders his acknowledgements to the officers having immediate charge of these collections, for numerous favors shown him, in a variety of ways, during the prosecution of his researches.

Nearly all the known species of the family are represented in the several collections above named; and the libraries of these Institutions contain all needed works of reference. Being based upon such ample data, this monograph ought to embody all that is known of the *Alcidæ* in a technical point of view, and constitute a fair exponent of the same. The writer ventures to indulge the hope that it may not be found to fall far short of this standard.

Before proceeding to the proper matter of the subject, it may be well to glance at what has already been done in this family of birds. Following is a list, in chronological order, of the principal works in which *Alcidæ* are made more or less of a specialty, with remarks upon each. It is obviously by no means a bibliography of the family; only those works being noticed in which some special point is presented. It may pass, however, for a reviewing sketch of the literature of the subject, and as such may be valuable and helpful to the student. Consultation of most of the works mentioned below is absolutely necessary to a correct understanding of the subject, except in so far as it may be obviated by perusal of the text of the present paper.

I. *Review of the Literature of the Family.*

Certain species of *Alcidæ* made their appearance in the very earliest ornithological writings of which we have any knowledge, long before the establishment of the science upon any fixed and recognized basis. However desirable it may be—as well in justice to early authors, as tending to bring the whole subject in the strongest light—to collate and identify, as far as possible, the older names of these species, the attempt to cite as authoritative names and descriptions which antedate the foundation of the binomial system of nomenclature would be at once embarrassing and profitless. There must be a fixed initial point for the commencement of authority in the matter of names in the existing system of zoological nomenclature; otherwise a writer might adopt names at pure caprice; in which event the species he treats of would be recognizable only by synonymy adduced, or descriptions appended, and names would fail of their proper purpose by becoming simply indices of the extent of his philological research. The date of the tenth edition of the Systema Naturæ furnishes an unobjectionable starting-point, beyond which investigation need only extend from motives of curiosity; and is on several accounts more eligible than the date of the twelfth edition.

Mœhring, a mononomial author whose work appeared in 1752, has very frequently been quoted as authoritative, notably, among European authors, by Gray, and among American by Cassin, Baird, Bryant and others, including the present writer. Five genera of *Alcidæ* are instituted in this work of Mœhring's: (1) *Chenalopex*, based on *Alca impennis;* (2) *Spheniscus*, upon *Fratercula arctica;* (3) *Arctica*, upon *Mergulus alle;* (4) *Uria* (sc. *Uria*), upon *U. grylle;* and (5) *Cataractes*, upon *Lomvia troile.* Of these five, *Arctica* and *Cataractes* have never

come into use, except in an isolated instance or two; *Uria* is in universal employ, accredited, however, as it should be, to a later writer; *Spheniscus* is used, in an entirely different acceptation, for a genus of Penguins; and *Chenalopex* for an Anserine genus. These names, though all positively identified, will not be countenanced in their Mœhringian acceptation, for reasons just mentioned.

(1758.) Linnæus, *Syst. Nat., ed.* x.—The Linnæan genus *Alca* at this date comprehended six species, to wit: *impennis*, *torda*, "pica," *arctica*, *lomvia*, *alle*. Two Guillemots—*grylle* and *troile*—are presented under the genus *Colymbus*. Excluding from these eight species *Alca* "pica," which is the winter plumage of *torda*, we have at the outset of authoritative records seven Linnæan names, for as many valid species, representing as many distinct genera. The twelfth edition (of 1766) gives us nothing new.

(1760.) Brisson, *Ornithologia*.—This author gives excellent descriptions of the then known species, but adds no new valid ones, though several stages of plumage are characterized under distinctive names. He was a polynomialist—to our lasting regret, and his great misfortune—and therefore not authoritative in the matter of species. With those, however, who quote him for genera, his *Fratercula* will stand as the name of the genus of which *Alca arctica* Linn. is the type; and his *Uria* for that one typified by *Uria grylle*.

(1764.) Brunnich, *Ornithologia Borealis*.—This author was a strict binomialist; the question of the adoption of his names only hinges upon the acceptation of Linnæus at 1758 or at 1766. Brünnich's names are in general employ, as they should be. The chief point of this work, regarding the Auks, is the characterization of *Uria ringvia*, which, though known long before, had been usually referred to *troile*. Brünnich describes the young or winter plumage of *Utamania torda* under the names "unisulcata" and "balthica;" the young *Fratercula arctica* as "Alca deleta;" the albino *Mergulus alle* as "Alca candida;" various plumages of *Uria grylle* as "grylloides," "balthica," and —— (No. 116). Brünnich's "Uria lomvia" is *Colymbus troille* Linn.; his "Uria troille" and "Uria svarbag" are both *Alca lomvia* Linn.; his "Uria alga" is *ringvia* Brünn. in winter plumage. His descriptions, though brief, are all recognizable. (Species now eight.)

(1769.) Pallas, *Spicilegia Zoologica, fasc.* v.—Among the writers of the 18th century, no one contributed so much to a knowledge of the *Alcidæ* as Dr. Pallas. He introduced more new valid species than any other writer, and gave us our first knowledge of some of the curious forms from the North Pacific. His works claim the high eulogium, that every one of the species they contain are identifiable from the descriptions, and that a species is very rarely twice described as new. In the Spicilegia four species are for the first time described: *Alca cirrhata*, *A. psittacula*, *A. cristatella* and *A. tetracula*. A white state of plumage of *Uria grylle* (or possibly of *U. columba*) is described as "Cephus lacteolus." The four species above mentioned are well described, and illustrated by plates. (Species now twelve.)

(1785.) Pennant, *Arctic Zoology*.—Although the author used only vernacular names, his work must be here considered, since in it four species are for the first time presented. These are the "Antient Auk" (for which the author is indebted to Dr. Pallas' MS.), the "Labrador Auk," the "Pigmy Auk," and the "Marbled Guillemot." The second and third of these are very dubious species, which have never been located to the entire satisfaction of ornithologists (cf. infrà, under head of *Fratercula arctica* and *Simorhynchus pusillus*); the first and fourth are good species. In this work the future *Uria columba* is hinted at, but not named. (Species now fourteen.)

(1788.) Gmelin, *Systema Naturæ*.—In this compilation by the professional plagiarist nothing new is given, but some points require notice. The genera *Alca* and *Colymbus* retain, in general, their Linnæan signification. Pennant's four species, above noticed, appear in proper Latin garb, as *Alca antiqua*, *A. labradorica*, *A. pygmæa* and *Colymbus marmoratus;* Pallas' four species are

continued. "Cepphus lacteolus" Pallas re-appears as "Colymbus lacteolus." Linnæus' "Colymbus" *troille* is repeated, of course; but the other two species of Murre, though having already made their début, are discontinued, unless one of them is intended by a certain "Colymbus minor" Gm., for which Brünnich's Nos. 110, 111, are cited. *Alca* "pica" and *A.* "balthica" are perpetuated. (No additions; species still fourteen.)

(1790.) Latham, *Index Ornithologicus.*—This is the one of Dr. Latham's several works in which species are binomialized, and it is therefore the authoritative one. Except in adopting *Uria* (after Brisson), the Index is nearly a repetition of Gmelin. We have nothing new, except the first unequivocal indication of *Uria columba* in Latham's "*Uria grylle* Var. B, from Aoonalaschka" ("fascia alarum gemina alba," which was "grylle Var. A" of Latham's Synopsis, vol. iii.) "Alca candida" Brünn. and "Cepphus lacteolus" Pallas—both of which are merely albinos—still hold their ground; but the nominal species based upon the plumages of *Utamania torda*, hitherto rampant, subside into "varieties." (Species still fourteen.)

(1790.) Bonnaterre, *Encyclopedie Methodique, Orn.*—Genus *Pinguinus* instituted, with *Alca impennis* L. as type. A certain "Uria nivea" is named, for which the author quotes Pallas, Spec. Zool. v. p. 33 ("lacteolus"; = albino *grylle* or *columba*).

(1794.) Donndorff (Johann August), *Beyträge Zoologische*, zweyter band, erster theil.—The great synonymist of the eighteenth century, as he fairly deserves to be called, gives no descriptions, but laboriously collates astonishing lists of synonyms. In the cases of some well-known birds, the citations stretch over several pages, giving one such an idea of the extent of the ornithological literature of the last century as could hardly be gained from any other work. Donndorff follows Linnæus in his reference of the Auks to two genera, *Alca* and *Colymbus;* the now sub-family *Urinæ* composing his "Colymbi mit dreyzehigen Füssen," as distinguished from the four-toed Divers proper. With this author *Alca* "pica" and "balthica" revive; *A.* "labradorica" and *A.* "pygmæa" continue in their original significance; Pallas' four species remain, and also his nominal species "lacteolus;" five varieties of *grylle* are enumerated, of which Var. "B" is *columba*. By the names "Colymbus minor" and "troile" the author probably intends to distinguish two species of Murre, but his synonyms are inextricably confused. The var. "γ" of *troile* is, however, unmistakeably *ringvia* of Brünn.

Such was the general status of Alcidine literature as it came from the hands of the writers of the eighteenth century. We have fourteen well-known valid species, and indications of the fifteenth (*Uria columba*).

(1801.) Lepechin, *Nova Acta Petrop.* xii.—*Alca camtschatica* described. (Species now fifteen.)

(1811.) Pallas, *Zoographia Rosso-Asiatica.*—Dr. Pallas for the second time comes forward to take a long step in advance of his contemporaries, with numerous new species from the North Pacific, and with a more extensive subdivision of the family. Six valid new species are described: to wit, "Cepphus" *columba*, "Cepphus" *carbo*, "Alca" *monocerata*, "Uria" *aleutica*, "Uria" *dubia*, and "Uria" *pusilla*. Four known species are re-named: the Antient Auk being called "Uria senicula," the Camtschatkan Auk "Uria mystacea," the thick-billed Guillemot "Cepphus arra," and the marbled Guillemot "Cepphus perdix" "Cepphus lomvia," Pallas, equals "Uria lomvia," Brünnich, equals "Colymbus" *troile*, Linnæus. As in 1769, Dr. Pallas calls the Guillemots all "Cepphus;" all the other Auks are consigned to "Uria" except the Puffins, for which the generic name "Lunda" (after Gesner) is employed. *Alca psittacula* is ranged in this genus. (Species now twenty-one.)

(1811.) Illiger, *Prodromus.*—Genus *Mormon* instituted for the Puffins.

(1816.) Vieillot, *Analyse.*—Genus *Mergulus* (after Ray) adopted for *Alca alle*

Linn. Genus *Larva* instituted for the Puffins. Genus *Alca* "Linn." adopted for *cristatella*.

(1818.) *Transactions of the Linnæan Society*, xii.—Sabine re-names the thick-billed Guillemot, as "Uria Brünnichii;" Leach, a few pages further on, bestows another name on the same bird,—"Uria Francsii."

(1819.) MERREM.—Genus *Simorhynchus* instituted, with *Alca cristatella* Pallas, as type. (Fide G. R. Gray.)

(1820.) TEMMINCK, *Man. Orn.*, ii.—Genus *Phaleris* instituted, with *psittacula* Pall. as type; containing this species and *cristatella* Pall.

(1821.) NAUMANN, *Isis*, p. 779, pl. 7.—The three known species of *Fratercula* ("Mormon," Ill.) are reviewed, with figures of the heads. A fourth species, Mormon *corniculatum*, is added. (Species now twenty-two.)

(1823.) LICHTENSTEIN, *Verzeichniss*, etc.—Alca *camtschatica* Lepechen is re-named "Mormon superciliosum." A certain "Uria Mandtii" is established, which is frequently quoted as a synonym of *Uria columba*, but appears to be rather an imperfect state of plumage of *grylle*.

(1824–5.) STEPHENS. *Continuation of Shaw's Gen. Zool.*, xii., xiii.—The species of the sub-family *Urinæ* are all included in the genus *Uria;* the type of the genus—*grylle*—is re-named "scapularis." *Phaleris* Temm. is adopted for the Starikis, comprehending *psittacula*, *tetracula*, *cristatella* and "pygmæa," the latter being the same as Gmelin's species of that name. *Fratercula* Briss. is adopted for the Puffins, though *Synthliboramphus antiquus* is included in the same genus. *F. glacialis* Leach appears.* Ray's specific name for *Mergulus alle*—melanoleucus—is adopted. *Utamania* n. g.,† based upon *A. torda*, is instituted; *Alca* "pica" is also ranged under it as a valid species,—making its last appearance upon the ornithological stage. (Species now twenty-three.)

(1827.) BONAPARTE, *Zoological Journal*, iii.—Alca *monocerata* Pall., redescribed as "Phaleris cerorhynca."

(1828.) BONAPARTE, *Syn. Birds U. S. in Ann. Lyc. Nat. Hist. N. Y.* ii.—Alca *monocerata* Pall. redescribed as "Cerorhinca occidentalis." In a foot note, under head of "*Phaleris cristatella* Temm.," Bonaparte quotes: "Alca cristatella et pygmæa, crested or flat-billed Auk, Lath. syn. iii. pl. 95, fig. 4. Phaleris cristatella Pl. Color. No. 200.‡ Alca cristatella Vieill. Gal. Ois. p. 297." (!)

(1828.) VIGORS, *Zoological Journal*, iv.—"Uria brevirostris" named. This is undoubtedly the young of a previously known species of *Brachyrhamphus*, but has never been positively identified. It is usually regarded as the young *B. marmoratus*.

(1829.) ESCHSCHOLTZ, *Zoological Atlas*.—Genus *Chimerina* instituted upon Alca *monocerata*, Pall., and the species called "Chimerina cornuta." Genus *Ombria* instituted upon Alca *psittacula*, Pall., upon which Temminck had previously based his *Phaleris*.

(1829.) Kaup. ———.—Genus *Cyclorrhynchus* instituted upon Alca *psittacula* Pall. (Fide G. R. Gray.)

(—?) TEMMINCK, *Planches Coloriées*. (No. 579).—"Uria" *Wurmizusume* described and figured. (Species now twenty-four.)

(1837.) BRANDT, *Bull. Sc. Acad. Imper. St. Petersburg*, ii.—During the time between the close of Dr. Pallas' labors and the appearance of Prof. Brandt's paper, there was a great deal of subdividing and re-arranging of the *Alcidæ*, and much sawing of the air in a variety of ways; but, beyond the addition of three species, nothing new or specially noteworthy was put forth. Prof. Brandt originates a new classification of the Auks, (the first one which lays claim to any truly scientific character), institutes several new genera, and describes four new species, besides re-naming some others.

* This species must have been previously named elsewhere, since Naumann has it in the Isis in 1821; perhaps in the Trans. Linn. Soc. of 1818, or thereabouts.

† Named in 1816.

‡ Pl. Color. No. 200 represents *camtschatica* Lepechin, not *cristatella* Pallas.

The Auks are primarily divided into two "tribes," called "Pterorhines" and "Gymnorhines." Under the former are ranged the true Auks, the Guillemots, and the Sea-dove; the latter comprehends all the rest of the family. The character is found in the feathering or nakedness of the nostrils. This scheme is spoken of more at length further on, and therefore need not be here criticised.

The new genera are numerous. Of these *Brachyrhamphus*, (type *marmoratus*,) *Lomvia*, (type *troile*,) *Synthliboramphus*, (type *antiquus*,) and *Ptychoramphus*, (type *aleuticus*,) are all valid, and were much needed. On the contrary, *Tylorhamphus*, (type *cristatellus*,) *Ceratoblepharum*, (type *arctica*,) and *Gymnoblepharum*, (type *cirrhata*,) were not called for, being antedated respectively by *Simorhynchus* Merrem, (1819,) *Fratercula* Brisson, (1760,) and *Lunda* Pallas, (1811.)

The founding of a subgenus, *Apobapton*, upon the type of *Brachyrhamphus*, is out of order. In the choice of names for the two subdivisions of *Uria* the author is unfortunate in taking the specific designation of the types of these genera, particularly in the case of *Lomvia*, which must stand for the genus of which *troile* is typical, necessitating a change in the specific appellation of one species of that genus, whose synonymy was already overburdened.

The four new species are Phaleris *microceros*, *Brachyrhamphus Wrangelii*, *B. brachypterus*, and *B. Kittlitzii*. Of the three last, *Wrangelii* is only to-day identified; the other two remain unknown, except by Brandt's description. *Brachypterus* is said to have the tarsi longer than the middle toe, which distinguishes it from all the known species of the genus. *Kittlitzii* is evidently a young bird, and probably not a valid species. It is very near *Uria brevirostris*, Vigors, if not the same, and may be the young either of *marmoratus* or *Wrangelii*. The present monograph does not recognize it as valid, leaving only three really new species to be attributed to Brandt's paper.

Brandt identifies and retains Uria *dubia* Pall. under name of Phaleris dubius; *Alca pygmæa* Gm. as Uria *pusilla* Pall., under name of Phaleris pygmæa. *Uria Wurmizusume* Temm., Pl. Color. 579, is renamed *Brachyrhamphus* (*Synthliboramphus*) *Temminckii*. *Alca monocerata* Pall. is renamed *Cerorhina* "orientalis," probably through a lapsus calami for *occidentalis* Bp. (Species now twenty-seven.)

(1836.) Bonaparte, *Geographical and Comparative List.*—*Phaleris microceros* Brandt is renamed as Phaleris "nodirostra."

(1839.) Vigors, *Zool. Voy. Blossom.*—Alca *antiqua* Gm. is renamed as "Mergulus cirrhocephalus."

(1839.) Audubon, *Orn. Biog.* v.—*Colymbus marmoratus* Gm. is renamed "Uria Townsendii." Audubon's figure of the supposed adult bird may be really *Brachyrhamphus Wrangelii* Brandt. His figure of the supposed young is really the adult *B. marmoratus*.

(1845.) Gambel, *Proc. Acad. Nat. Sc. Phila.*—Uria *aleutica* Pall. is renamed as "Mergulus Cassinii."

(1849.) Gray and Mitchell, *Genera of Birds*, iii.—A great blemish is the inclusion of the Penguins as a subfamily of the *Alcidæ*, coming in between the Starikis and the Murres. Otherwise the arrangement here adopted of the Alcidæ is as faultless as any ever proposed. Three subfamilies are recognized: *Alcinæ* for the true Auks and the Puffins; *Phaleridinæ* for the Starikis; and *Urinæ*, for the Guillemots. (This arrangement is noticed further on in connection with Prof. Brandt's paper, under head of the general characters of the family). *Fratercula* Briss. is adopted for the Puffins; *Phaleris* Temm. for all the Starikis, except Alca *monocerata* Pall., for which *Cerorhina* Bp. is used; *Brachyrhamphus* Brandt, in the same acceptation as used by its founder; *Uria* Briss. for the Guillemots; and *Arctica* Moehring, for the Sea-doves. Under the head of the latter, besides *alle*, are ranged cirrocephalus, Vigors, and Cassinii, Gambel, with the exception of which, the lists of species are very accurate and very full. Alca pygmæa Gmel. is identified with Uria *pusilla* Pallas; *Uria* Mandtii Licht. is used for Cepphus *columba* Pallas.

(1851.) Bonaparte, *Proc. Zool. Soc. London.*—A new genus and species

described—*Sagmatorrhina Lathami*, with which Alca labradoria Gm. is identified. (Species now twenty-eight.)

(1856.) Bonaparte, *Comptes Rendus*, xlii.—That portion of the Tableau Comparatif des Pelagiens which regards the Auks represents very nearly the classification now most in vogue, founded by Mr. G. R. Gray. The family is divided into three subfamilies--*Alcinæ*, embracing only two species; *Phaleridinæ*, comprising all the Starikis; and *Urinæ*, including the Guillemots. It is thus the same as Gray's arrangement, except in excluding the Penguins; but in its minor details it is unique in several features. The genus *Pinguinus*, Bonnaterre, is adopted, and *Alca* left for *torda*. *Simorhynchus*, Merrem, is taken for its type, (*cristatellus*) and *Phaleris*, Temminck, for its type. (*psittacula;*) the other small Phaleridines are ranged under *Tylorhamphus* Brandt, except *microceros*, which is put under *Ciceronia*, Reichenbach. *Uria* is subdivided into *Lomvia* Brandt for the larger species, and "Cephus" Pallas for the smaller ones. Most of these points are tenable, but some are not. Some very obvious improprieties are evident in the handling of the species. Thus Bonaparte insists on retaining "occidentalis" and "nodirostra," two names of his own that he knew were antedated, one by *monocerata* Pallas, and the other by *microceros*, Brandt. *Uria columba* is ranged as a synomym of *grylle*, while *Mandtii* is allowed to take its place. The *Uria* "unicolor" Benicken, which, according to the best authority, is only a state of plumage of *grylle*, is given as a valid species, and referred to a different subgenus. In this paper, as in others written towards the close of the life of the great ornithologist, may be discerned an inclination to lead opinion by the mere weight of a name, or force of personal authority.

(1858.) Cassin, in *Baird's Birds of North America*.—Bonaparte's article just spoken of is made the basis, in a general way, of Mr. Cassin's paper, but with some important modifications. Only two subfamilies are admitted, *Alcinæ* and *Urinæ*, the former comprehending the Auks proper and the Starikis. *Chenalopex* Moehring is used as a subgeneric appellation for *Alca impennis*. *Mormon* Illiger is used for the Puffins, with *Lunda* Pall. and *Fratercula* Briss. as subgeneric divisions. *Phaleris* Temm. is employed generically for the majority of the Phaleridine forms, with *Simorhynchus* Merrem, *Tylorhamphus* Brandt, and *Ciceronia* Reichenbach, as subgeneric divisions. The erroneous assignment of *Tylorhamphus* is the same as that made by Bonaparte. The forms not included under *Phaleris* are each given independent generic rank. A new species of *Cerorhina* is described—*C. Suckleyi*—for a discussion of which the reader is referred further on. Among the *Urinæ*, the genus *Uria* Moehring is subdivided, after Keyserling and Blasius, into two subgenera—*Uria* proper and *Cataractes* Moehring. *Brachyrhamphus* Brandt is adopted for the Murrelets,* with *Apobapton* Brandt as a subgenus.

This article treats of all the known species of the family, and is, in fact, a monograph of the subject, at once very accurate, and, as far as it goes, complete. Excellent descriptions, in most cases original, are given, together with many synonyms, lists of specimens in the museum of the Smithsonian Institution and Philadelphia Academy, and critical and explanatory remarks. Although the present writer does not endorse all of the opinions maintained in this article, he considers it as by far the best that has ever appeared in print. (Species now twenty-nine.)

(1859.) Xantus, *Proc. Acad. Nat. Sc. Phila.*—*Brachyrhamphus hypoleucus*, a new species, described. (Species now thirty.)

(1861.) Bryant, *Proc. Bost. Soc. Nat. Hist.*—"A monograph of the genus *Cataractes* Moehring," with full lists of synonyms, and very accurate descriptions. The family is named "Plautidæ" after Klein. The genus is considered in its restricted sense, including only *troile* Linn., *ringvia* Brünn., and *lomvia*

* The present writer proposes this English name for the species of *Brachyrhamphus*.

Linn., to which a new species, *C. Californicus*, is added. This is a very valuable contribution. (Species now thirty-one.)

(1862.) Newton, *Ibis*, *Oct.* From among the many contributions to the Natural History of the Great Auk, this admirable paper is selected for special mention, both as embodying about all that was known upon the subject previous to its publication, and as containing the results of the diligent and careful researches of the author and Mr. J. Wolley, in Iceland. It is probably the best article upon the subject extant; to which the reader may refer in full confidence that he will find an epitome of our present knowledge. Mr. Newton is of opinion that the Great Auk may still live. He attributes the extinction to which it is surely doomed, mainly to direct human interference. The paper is again referred to, and quoted, in the present memoir.

(1867.) Schlegel, *Catalogue of the Museum of the Pays-Bas*, *livraison* ix. The article "Alca" is in one sense nearly a monograph of the subject, since the greater part of the species of the family are represented in the Museum of the Pays-Bas, and therefore admitted as valid by the author. Unfortunately, however, the author's ultra-conservatism, on matters specific as well as generic, does not allow him to keep pace with the progress of science, and as a consequence, his system of nomenclature and classification is simply curious. One seeks in vain to divine the reason for the maintenance and expression of such peculiar views, unless it be the author's intention to administer a sort of counter-irritant as a remedy against Brehmomania, or to launch a severe satire against the "furor genericus," and other crying evils of the day. Such extreme views, if discreetly indulged for either of the charitable purposes just suggested, are perhaps excusable; the only question is, whether the remedy is not worse than the disease.

Aside from its value as a Museum Catalogue, the present article is chiefly useful for its accurate indications of different stages of plumage, of differences in dimensions of variable species, and as affording some interesting data in the way of locality. The "genus Alca" is made to hold all the *Alcinæ* and all the *Urinæ*. The Starikis appear under the genus *Simorhynchus;* the Puffins under *Lunda*. It is impossible to subject this arrangement to criticism, since in it there is nothing approaching a classification, and arbitrary illogical opinion is not to be brought under critical review. The common Guillemot appears as "Alca lomvia," though no point of synomymy is more incontestible than that its proper specific name is *troile*. *Ringvia* is considered as a variety of the same. *Uria columba* is not regarded as valid, apparently because the wing-patch of *Uria grylle* is well known to vary in its characters. Alca pygmæa Gm., *Uria pusilla* Pall. and *Phaleris microceros* are thrown together under the common name of "Simorhynchus pygmæus." Alca *tetracula* Pall., and Uria *dubia* Pall., are both regarded as the young of *cristatellus*. *Sagmatorrhina Lathami*, Bonaparte, and *Cerorhina Suckleyi*, Cassin, are both referred to Alca *monocerata*, Pallas. Mormon *glacialis* Leach is not recognized. The *Brachyrhamphi* are not included; but the highly characteristic remark occurs, (p. 21) "Il convient d'étudier de rechef les oiseaux décrits sous les épithètes de Kittlitzii, Wrangeli et brachyptera, et même l'Alca marmorata"!

(1867.) Salvadori, *Descr. Alt. Nuov. Ucc. Mus. di Torino.— Uria Craveri* described. This a new *Brachyrhamphus* from California, closely allied to *B. hypoleucus*. (Species now thirty-two.)

Of the thirty-two species noted in the preceding paragraphs, and held to be valid, twenty-eight are contained in the various American collections to which the writer has had access, and are in the present paper identified and described directly from the specimens themselves. The four species not examined are: "Uria" *dubia* Pallas; *Brachyramphus brachypterus* Brandt; *Sagmatorrhina Lathami* Bonaparte; and "Uria" *Craveri* Salvadori. Of the two last the writer has received some information through private channels, beyond that contained in the published papers; of the two first he knows nothing, except from the original descriptions.

A new and very curious species of *Simorhynchus* is described in the following pages, making a total of thirty-three.

II. *Of the characters of the Family, and its sub-divisions.*

The Auks form a very natural family of birds, distinguished by marked and unmistakable characters from any other. With a single exception,* there is no bird found to present in any notable degree a leaning towards the peculiarities of the *Alcidæ;* and the members of the family, without exception, preserve intact those characters which define the group so trenchantly, showing in no single instance a tendency to aberration. The rigidness with which it is possible to circumscribe the *Alcidæ* is in the highest degree satisfactory, in a class of animals in which the recognition and definition of subordinate groups is peculiarly difficult.

The natural place of the family in our ornithotaxis appears as definite as the characters which separate its forms from other birds. By common consent, the *Alcidæ* are regarded as next to the lowest of birds. The degradation of the type or ideal bird which the Auks represent is only carried further in one family—the *Spheniscidæ*. From the latter, which is at the bottom of the scale, we ascend one step to *Alcidæ;* another brings us to the *Colymbidæ* and *Podicipidæ*. These four families constitute the order *Pygopodes*, or the Brachypterous Natatores. The position occupied by the Auks in this order is so evident as not to admit of question

It is only necessary to allude to the wings of the *Spheniscidæ*, without dwelling upon the point, to separate this family from the Auks. The tetradactylous feet of the other two families distinguish them with equal facility. Auks are brachypterous, brachyurous, tridactylous natatores, with lateral nostrils. This expression is a perfect diagnosis.

The Auks are confined to the northern hemisphere. Some representatives have been found as far north as explorers have penetrated. The great majority live in more temperate latitudes. A more or less complete migration takes place with most species, which stray southward, sometimes to a considerable distance, in the autumn, and return north again to breed in the spring. A few species appear nearly stationary. The most southern recorded habitat of any member of the family is about latitude 21° N., on the Pacific coast of North America, but this is rather exceptional. The species are very unequally divided between the two oceans. The Atlantic has but few representatives compared with the Pacific. On the northern coasts of the latter the family reaches its highest developement; the greatest number of species, of the most diversified forms, are found there, though the number of individuals of any species does not surpass that of several Atlantic species. Comparatively few species are common to both oceans. All the members of the family are exclusively marine.† They are decidedly gregarious, particularly in the breeding season, when some species congregate in countless numbers. Usually one, often two, rarely if ever three eggs are laid, either upon the bare rock or ground, or in crevices between or under rocks, or in burrows excavated for the purpose. Auks are all altrices, and are believed to be chiefly monogamous. The young are at first covered with long soft wooly down; rarely stiffish hairs appear on some parts. The moult is double. The young of the year usually differ from the adults; the latter usually differ in their summer and winter plumages. A very prevalent feature is the possession of crests or plumes, or elongated feathers of a peculiar shape on the sides of the head. All the species walk badly; some scarcely walk at all. The position of the legs with reference to the axis of the body necessitates an upright position when standing. The birds appear to rest on their rumps, with the feet extended horizontally before them, most

* The genus *Pelecanoides*, of the *Halodromine* (*Procellariidæ*), in all details of external form, except those of the bill, is essentially like *Mergulus*.

† *Uria grylle* is found on the southern shores of Hudson's Bay; but this fact can hardly furnish an exception to the statement.

of the tarsus touching the ground. The Puffins, however, and a few others, stand well on their feet. All the species but one, fly well, with rapid vigorous motion of the wings, in a straight, firm, well-sustained course. All progress on or under the water with the utmost facility. They are very silent birds; the voice is rough and harsh; the notes are monotoned. They feed exclusively upon animal substances procured from the water.

The uniformity of structure which obtains throughout the family has already been mentioned; the following paragraphs describe this structure in a general way, so far as the details of external form are concerned:*

The general form is stout, compact and heavy. The body is depressed, flattened underneath. The neck is short and thick. The head is large and heavy, usually oval in shape, more or less flattened laterally, more or less drawn out anteriorly, and sloping gradually on all sides to the bill, but sometimes ending abruptly. The plumage about the head is very soft, dense, and short, except those feathers which constitute the peculiar crest or lateral plumes already mentioned. That of the upper parts is very closely imbricated; that of the lower is very thick, compact, elastic, and otherwise eminently fitted to resist the action of water.†

The bill, though constantly preserving certain characteristics, varies to a remarkable degree in the details of its shape. The broad statement may be made, that no two species‡ of the family have bills identical in shape. So unending is the variation in the bill, that in some cases great differences in shape seem of scarcely more than specific consequence, as is especially the case in the genus *Simorhynchus*. The bill in the great majority of species is more or less compressed, sometimes excessively so; it is frequently, however, nearly as wide as high at the base, and more or less subulate. The contour of the bill in many instances deviates from an ordinary standard so much that the shape may almost be called monstrous. A striking peculiarity of the bill in several genera is the presence of supernumerary elements or accessory pieces, taking the form of salient protuberances. These are usually developed on the culmen; in one instance on the gonys; in one at the angle of the rictus; in several along the feathered base of the bill. Besides these appendages, there are often found grooves and ridges on the sides of one or both mandibles. The culmen is always more or less convex; in one instance it is bi-convex. The tomial edges of the mandibles are more or less sinuate; sometimes nearly straight; usually decurved at the tip, and slightly notched; in one instance recurved. The rictus is ample.§ The mandibular rami approach each other with a very narrow angle, and soon join, producing a long gonys, which is usually nearly straight. One genus has a very convex gonys; in two others the gonys runs the whole length of the bill, there being no mandibular rami proper. The bill is entirely horny, except in two species, in which a soft membrane overlaps the base of the upper mandible; and in a third, where a peculiar knob is not strictly corneous.

The nostrils are basal, lateral, marginal, impervious; usually linear, or narrowly oval; in a few instances placed further from the commissural edge of the upper mandible, and nearly circular. The nasal fossæ are usually very evident; are sometimes hidden by feathers; at others are wholly wanting. The extension of the feathers into the nasal fossæ varies in degree, when it occurs. In just about half the species the nostrils are naked; these usually have no true nasal fossæ. In the other half fossæ occur; entirely obtected by feathers in three genera; partially covered in the rest. The significance of these features will receive further attention below.

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* The writer hopes to bring forward, at some future time, a memoir on the anatomy of the family.

† Cf. Nitzsch's Pterylography for pterylosis of *Utamania torda*.

‡ Is *Uria ringvia* specifically distinct from *U. troile?*

§ In two genera, in which the excessive compression of the bill produces a very constricted rictus, its amplification is provided for by means of a dilatable skin at the angle of the mouth.

The wings are short. In no instance do they, when folded, reach to the end of the tail. In one species they are so undeveloped in their terminal segments* that the power of flight is abrogated. The first primary is always longest; the rest rapidly and regularly graduated; all taper to a sufficiently fine point. The secondaries are very short, and broadly rounded. The primary coverts are very long, reaching much more than half-way from the carpus to the end of the first primary. The first row of secondary coverts reach nearly to the end of the secondaries. The under wing coverts are very long. The axillars are short or wanting. The wing as a whole is convex above, concave below, narrow, sharp, stiff, somewhat falcate. These points of structure are constant throughout the family.

The tail is very short; its length is contained, on an average, about three times in the length of wing from the carpal-joint. It is usually slightly rounded, sometimes nearly square, in a few instances pointed; in a few more the central rectrices are slightly shorter than the next pair. The individual feathers are usually very obtuse at the end. Both sets of coverts are long; the inferior usually reach nearly or quite to the end of the tail.

The feet are small, and placed far back, as has been said. The thighs are contained within the general skin of the body. The legs are feathered nearly or quite to the tibio-tarsal joint. The tarsus is short, sometimes excessively abbreviated, rarely equal to the middle toe without its claw, never (?†) longer. It is usually much compressed, is sometimes almost as sharp as that of *Colymbus*, is frequently nearly as broad laterally as antero-posteriorly. Its covering varies with different genera. It is usually reticulate behind and laterally, with a row of scutellæ in front, which rarely, however, if ever, extend its whole length. In some genera it is entirely reticulate; in others, the scutellation extends on one or both sides. The tarsal envelope varies so much that it is not available as a character for subdivisions higher than generic. The toes are very long; the outer and middle always of nearly the same length; the inner shorter, its claw just reaching the base of the middle claw. There is no hind toe. Dissection reveals the rudiment of a hallux, which, however, is never developed sufficiently to make even a well-marked prominence. The webbing of the toes is complete. The claws are all moderately arched, compressed and acute; the inner edge of the middle is more or less dilated; the middle is always the largest, except in two genera, which present the peculiarity of having a very large semi-circular inner lateral claw, which, moreover, lies horizontally instead of vertically.

That rigid adherence to the type of structure just described which all the species maintain, while facilitating the recognition of the family as a family, is a serious obstacle in the way of defining its subdivisions with precision. With no very abrupt transition from one form to another, and without any very marked modification of general features, the minor groups seem to be formed mainly by the varying combination of the few differences in structure which obtain in the family. The assemblage of characters, rather than the presence or absence of particular features, in most cases determines the genera; and no two species are absolutely alike in all points of form.

——"Facies non omnibus una,
Nec diversa tamen, qualis decet esse sororum."

In one of the ablest papers that has appeared upon this subject, Professor Brandt divides the *Alcidæ* into two subfamilies: those with feathered, and those with naked nostrils. In this arrangement the Guillemots stand next to the typical Auk—*A. torda*. Viewed from any other standpoint the two forms

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* *Cf.* Mr. A. Newton's article in the "Ibis" for October, 1862. As there stated, the humerus of *Alca impennis* is of normal size; the antibrachium, carpus and metacarpus, and their quills, are shortened.

† *Brachyrhamphus brachypterus* is said by Brandt to have the tarsus longer than the middle toe.

appear to represent the extremes of structure in the family; particularly in regard to the bill, cultriform in one, subulate in the other. The two types are by most authors placed at opposite ends of the generic chain, and separated by all the Starikis. Attentive consideration of all the bearings of the case may very likely result in the opinion, held by the present writer, that the difference between the views of Prof. Brandt and other writers is rather apparent than real. It should be borne in mind that the *Alcidæ* are a family very rigidly circumscribed, and one showing no tendency to aberration, or to connect itself intimately with the families standing next to it on either side. Whether as cause or consequence of this, the fact is indisputable, that the genera of *Alcidæ* are not strung along in a chain whose ends seem as it were to be linked with the genera of other families; they tend, on the contrary, to aggregation in a circle about a common centre. We may take any genus—it matters not which—we shall find its closest ally to the right and to the left; and the circuit shall be complete when all the genera have been considered. To illustrate this point: Prof. Brandt, like all other writers, takes the typical *Alca* as his starting point. With the feathering of the nostrils as a fundamental feature, *Uria* and its subdivisions must come next, then *Brachyrhamphus;* this leading through *Mergulus* into the true Phaleridines, by means of *Ptychoramphus*. Beginning with those Phaleridines with the simplest bills, he progresses to those with more complex bills, ending with *Ombria*, which last, through *Cerorhina*, conducts to *Fratercula*, which ends the series. There is nothing strained or forced in this; the succession of the genera is perfectly natural. But it so happens that *Fratercula* is as closely, or even more closely, allied to *Alca* proper than *Uria* is. We cannot disturb in any essential degree the generic series of Prof. Brandt, but we could with entire propriety go directly from *Alca* to *Fratercula*, and thence backwards over the same track, ending with *Uria*, which would then be at the opposite extreme of the series. It is asserted, without fear of reasonable contradiction, that to begin anywhere in this natural series of genera and progress through it, is to be brought back to the starting point

It is not, perhaps, possible to divide this generic circle without the exercise of some arbitrary jurisdiction. If there be included in it two or more subfamilies capable of precise definition, the fact has eluded the writer's research. There are, however, in the series two places where a dividing line may be drawn. Prof. Brandt drew but one, relying upon the single character which he found to apply so well, albeit it may be an arbitrary one. Other writers have made likewise but two subfamilies, differently framed however; the *Alcinæ*, including the true Auks, together with the Phaleridine forms, united because of their short, stout, high bills; and the *Urinæ*, separated on the ground of their long, slender subulate bills. Others again, particularly Mr. G. R. Gray and Prince Bonaparte, have drawn two lines, recognizing three subfamilies; and this course appears to be the one that holds closest to nature, provided the family be really susceptible of subdivisions higher than generic. By simply reducing Prof. Brandt's fundamental character to the level of one drawn from the general structure of the bill, three subfamilies stand forth with tolerable distinctness. The *Alcinæ* have feathered nostrils and cultriform bills; the *Phaleridinæ*, naked nostrils and cultriform bills; the Urinæ, feathered nostrils and subulate bills. This certainly appears to be a distinction with a difference, and will be so held in the present paper.

The arrangement of the *Alcidæ* here submitted is a modification of Professor Brandt's, providing for the recognition of three in place of two subfamilies. In this particular it is substantially the same as Mr. Gray's, but the sequence of the genera is entirely different, and is nearly that of the first mentioned author. Beginning with typical *Alca* it passes to *Fratercula*, and ends with *Lomvia*, instead of passing to *Lomvia* and ending with *Fratercula*. But in either case the collocation of the genera is essentially the same. It is believed

that this sequence of genera cannot be broken in upon to any considerable degree, without the rupture of a natural series as a consequence.

Family *ALCIDÆ*.

CH.—Tridactylous, brachypterous, brachyurous Natatores, with lateral nostrils.

A.—Subfamily ALCINÆ.—Not crested; with feathered nostrils; compressed cultriform bill, much higher than wide at base, without appendages, but grooved on the sides; tail pointed.

1. *Alca.*—Wings rudimental, not admitting of flight.

2. *Utamania.*—Wings fully developed, admitting of flight.

B.—Subfamily PHALERIDINÆ.—Usually crested, or with elongated feathers on head; with naked nostrils; bill variable, always compressed, higher than wide at the base, often with appendages; tail nearly even.

3. *Fratercula.*—Inner lateral claw very large, semi-circular, acute, horizontal; bill excessively thin, its base ridged, its culmen simple, with one curve; under mandible grooved; no crest; palpebral appendages; a furrow in plumage behind eyes; tarsi anteriorly scutellate.

4. *Lunda.*—As in *Fratercula;* culmen with an accessory piece, and two curves; under mandible smooth; long crests; no furrow in plumage; no palpebral appendages.

5. *Ceratorhyncha.*—Inner lateral claw normal; bill without a basal rim; base of upper mandible with a prominent upright horn; rami of lower mandible with an accessory piece; head with elongated feathers; tarsus anteriorly scutellate.

6. *Sagmatorrhina.*—Base of upper mandible overlapped by a soft membrane; no accessory piece on lower mandible; otherwise as in *Ceratorhyncha.*

7. *Simorhynchus.*—Bill variable, usually with irregular outline or with appendages; head with a crest or elongate feathers; tarsi reticulate.

8. *Ptychorhamphus.*—Bill stout, conico-elongate, wide at base, acute at tip; base of upper mandible with transverse striæ; upper border of nostrils dilated, flaring; no crests.

C.—Subfamily URINÆ.—Nostrils more or less completely feathered; bill elongated, more or less slender and subulate, without appendages or vertical grooves; head not crested, (except in one species.)

9. *Mergulus.*—Nostrils nearly circular, not completely feathered; bill stoutest and shortest in this section; tail much graduated; tarsi scarcely compressed, anteriorly broadly scutellate.

10. *Synthliborhamphus.*—Nostrils broadly oval, incompletely feathered; bill stoutish, but much compressed; tail nearly even; tarsi excessively compressed, anteriorly and internally scutellate.

11. *Brachyrhamphus.*—Nostrils oval, feathered; bill small, very slender; tail short, little graduated; tarsi reticulate, very small and slender, not compressed.

12. *Uria.*—Bill about equal to tarsus; gonys half the culmen; nasal fossæ wide and deep, not entirely filled with feathers; upper mandible with no groove at tip; outer lateral claw grooved; tail contained $2\frac{1}{3}$ times in the wing; tarsi reticulate; no furrow in plumage of head.

13. *Lomvia.*—Bill much longer than tarsus; gonys much more than half the culmen; nasal fossæ long and narrow, completely feathered; upper mandible with a groove at tip; outer lateral claw smooth; tail contained $3\frac{2}{3}$ times in wing; tarsi anteriorly scutellate; a furrow in plumage behind the eyes.

III.—*Descriptions of Genera and Species.*

1. Subfamily ALCINÆ.

ALCA, *Linnæus.*

Chenalopex, Mœhring, Av. Gen. 1752, p. 65, No. 68.
Alca, Linnæus, Syst. Nat. i. 1758; and of authors.
Pinguinus, Bonnaterre, Ency. Method. Orn. 1790, p. 28.

Size largest in the family. Form heavy, compact, robust. Head large, ovate, produced forwards. Neck moderately long, thick. Wings morphologically perfect, teleologically rudimental, not admitting of flight, in length from carpal joint to end of longest primary scarcely twice as long as tail; when folded not reaching the tail. Tail short, pointed. Legs short and stout. Webs broad and full. Tarsi compressed; their anterior ridge and superior surfaces of toes scutellate, lateral and posterior aspects reticulate, the plates on the latter very small. Tibiæ feathered nearly to the joint. Bill about as long as the head, large, strong, very deep, exceedingly compressed. Upper mandible with culmen about straight for half its length, then regularly convex, tip obtuse, declinate, scarcely overhanging; a deep groove on its side at base, parallel with the outline of feathers; its side then perfectly smooth for a space, then deeply impressed with six to ten oblique curved sulci. Gape very large, running far back; line of commissure nearly following that of culmen. Eminentia symphysis slight; gonys nearly straight. Lower mandible two-thirds as deep as upper, its sides impressed with six to ten straight, vertical sulci. Feathers about base of mandibles short, very compact; extending downwards from base of culmen, a little forwards, to commissural edge of upper mandible; reaching much further on sides of lower mandible; wholly covering the moderately long, very narrowly linear, impervious nostrils, which are situated just above the commissure.

It is unnecessary to compare this genus with any other. *Utamania*, most closely allied, is at once distinguished by its teleologically perfect wings, though nearly identical with *Alca* in other points of structure. The only known representative of the genus is remarkable, both for its large size, and for not possessing the power of flight, in consequence of which it may be said to represent, in the Northern Hemisphere, the numerous Penguins of the Southern. By many ornithologists it is believed to have very recently become nearly or quite extinct.

Rigid adherence to the law of priority would necessitate the use of a different name for this genus. "Alca" was first applied by Linnæus, in 1744, to the genus of which the bird now called *Fratercula* or *Mormon arcticus* is typical; and even as used by Linnæus in 1758 it has *torda* as its recognized type, according to that rule which regards the species first mentioned as type, when none is otherwise indicated; so that it cannot, with strict propriety, be used at all in this connection. But the name has become so firmly established by common consent and long usage, that it would be ruthless, as well as profitless, to attempt its supercedure by *Chenalopex* of Moehring, 1752; particularly as this latter word has come into extensive employ for an Anserine genus. The genus *Alca*, as framed by Linnæus in 1758, included both *torda* and *impennis;* and when restricted, by the generic separation of these two types, there seems no good reason why the first mentioned should be regarded as more peculiarly typical of the genus than the last. Should *Alca* be reserved for *Fratercula arctica*, or for *Utamania torda*, it will be apparent that numerous unwarrantable innovations necessarily follow; while its employ in connection with *impennis* entails no such consequences.

ALCA IMPENNIS *Linn.*

Chenalopex, Mœhring, Av. Gen. 1752, p. 65, No. 68. "Rostrum conoides, conuexum, ad latera compressum, aliquot sulcis transuersis canalicula-

tum," etc. Quotes *Anser magellanicus*, Clus. Worm. Raii, Will. Orn. 242, and *Alcæ species*, Linn. ed. vi, gen. 52.

Alca (*Chenalopex*) *impennis*, Cassin, Baird's B. N. A. 1858, p. 900.

Mergus americanus, "Charleton, Onom. Zoic. p. 96, No. 10." "Nieremb. Exot. lib. 10, c. 27," fide Donndorff. Not *Mergus americanus* Cassin, 1853.

Alca major, Brisson, Ornithologia, vi, 1760, p. 85, pl. 7.

Alca impennis, Linnæus, S. N. ed. x, 1758, p. 130, No. 2. Id. ibid. ed. xii, 1766, p. 210, No. 2. Quotes *Alca major* Briss. and *Mergus americanus* Clus. Exot. 103. Brünnich, Orn. Bor. 1764, p. 26, No. 105. Gmelin, S. N. 1788, i, pt. ii, p. 550, No. 3. Lath. Ind. Orn. ii, 1790, p. 791, No. 1. Donndorff, Beyträge Zoologische, ii, pt. i, 1794, p. 817. Sander, Grösse u. Schönh. Natur. i, p. 243. Hermann, Tab. Aff. Anim. p. 150. Temminck, Man. Orn. ii, 1820, p. 939. Stephens, Shaw's Gen. Zool. xiii, 1825, p. 51. Bonaparte, Synopsis, 1828, p. 432. Audubon, Orn. Biogr. 1838, iv, p. 316. Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 345. Fleming, Hist. Brit. Anim. 1842, p. 129. Gray, Genera Birds, iii, 1849, p. 637. Thompson, Nat. Hist. Ireland, 1851, iii, p. 238. Macgillivray, Hist. Brit. Birds, 1852, ii, p. 359. Steenstrup, "Vidensk. Middell. for Aaret, 1855; Kjöbenhavn, 1856—57, pp. 33—116." Newton, Ibis, 1862, p.——, (Historical.) Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 13.

Pinguinus impennis, Bonnaterre, Ency. Method. Orn. 1790, p. 29. Bonaparte, Consp. *Gav.* Comptes Rendus, 1856, p. 774.

Description (from the specimen in the Philada. Acad.)—The white spot between the eye and bill is ovate in shape, its upper border a little straightened, its small end towards, but not quite reaching, the bill, its large end extending to, but not around, the eye; the width of the black space between it and its fellow is rather more than half an inch. The back is dusky-black; other dark-colored parts with a good deal of clear brown, especially on the head. The under parts, including the tail coverts, are white, this color running far up on the front of the neck in a narrowly acute angle. The under wing coverts are ashy-gray. The secondaries are narrowly but distinctly tipped with white. The bill is deep black, its sulci dull white. The feet are dark, their precise color at present undefinable.

Dimensions.—"Length about 30 inches;" wing 5·75; tail about 3·00; bill along gape 4·25; chord of culmen 3·15; greatest width of bill ·66; greatest depth of upper mandible 1·00, of lower ·66; tarsus 1·66; middle toe and claw 3·25; outer 3·00; inner 2·25.

The occurrence of this species on the coast of North America has not been authenticated of late years. Perhaps the last instance on record is that given by Audubon on page 316 of the fourth volume of "Ornithological Biography." "The only authentic account of the occurrence of this bird on our coast that I possess, was obtained from Mr. Henry Havell, brother of my engraver, who, when on his passage from New York to England, hooked a Great Auk on the banks of Newfoundland, in extremely boisterous weather." This specimen was not preserved. "When I was in Labrador," continues Audubon, "many of the fishermen assured me that the 'Penguin,' as they name this bird, breeds on a low rocky island to the south-east of Newfoundland." The present writer received similar assurances when in Labrador in 1860—the place designated being the "Funks." Audubon also states that "an old gunner residing on Chelsea Beach, near Boston, told me that he well remembered the time when the penguins were plentiful about Nahant and some other islands in the Bay."

Two specimens only are known to exist in any American museum. One is in the Philadelphia Academy; its history is uncertain. The other, in the Vassar College, at Poughkeepsie, N. Y., is the original of Audubon's plate and description, as stated in the following note from Prof. Sanborn Tenny, favored in reply to questions regarding it: "The Great Auk, presented to Vassar College by J. P. Giraud, Jr., Esq., is in a perfect state of preservation. This specimen is the one from which Audubon made his drawing, and it was presented

to Giraud by Audubon himself. Neither Giraud nor myself has further knowledge of it than what is contained in Audubon's works."

Concerning Mr. Audubon's specimen, Mr. Cassin remarks (B. N. A., p. 901), that it was "obtained by him (Mr. A.) on the banks of Newfoundland;" upon which statement Mr. A. Newton (Ibis, Oct., 1862) observes: "In 1857 I was assured by Mr. Bell, the well-known taxidermist at New York, who knew Mr. Audubon intimately, that he never possessed but one specimen of this bird; and if we turn to Prof. MacGillivray's 'History of British Birds' (vol. v. p. 359), we find him saying that he never saw but two examples of the species, one in the British Museum, and 'the other belonging to Mr. Audubon, and *procured by him in London.*'" This serves to throw some little light on the history of the specimen now in the Vassar College, Poughkeepsie, N. Y.

In the Annals and Magazine of Natural History for 1864, p. 235, is given, by Mr. Robert Champley, "a list of the present possessors of the birds, skeletons and eggs of the *Alca impennis*:" this gentleman being cognizant of the existence of twenty-seven skins, six skeletons, and fifty-three eggs. Dr. G. Hartlaub (Bericht üb. d. Leist. in d. Naturg. der Vögel for 1864) remarks upon this enumeration: "Es ist dieses Verzeichniss indessen sehr unvollständig. So z. B. geschieht des schönen Exemplares der Bremer Sammlung so wie des prachtvollen Ei's im Museum zu Oldenbung keine Erwähnung." Mr. A. Newton, on the subject of existing specimens, has (l. c.) the following: "If all the stories we received can be credited, the whole number would reach eighty-seven. I should imagine sixty to be about the real amount;" and again: "It is pretty evident that most of the specimens of the Great Auk and its eggs, which now exist in collections, were obtained from Eldey between the years 1830 and 1844.*

Two eggs are contained in the Philadelphia Academy's collection.

Mr. Alfred Newton's paper in the "Ibis" for October, 1862, entitled "Abstract of Mr. J. Wolley's Researches in Iceland respecting the Gare-Fowl or Great Auk (Alca impennis, Linn.)," is exceedingly valuable, being one of the most complete and satisfactory histories of the bird ever published; and may be consulted with the greatest pleasure and profit. The writer is at special pains to correct the very prevalent erroneous impression, that the Great Auk is a bird of high latitudes. His researches warrant his belief that "the Gare-fowl has probably never once occurred within the arctic circle." Mr. Selby's statement (Brit. Orn., ii. p. 433) of its occurrence in Spitzbergen is shown to be unfounded; and notices of its occurrence in Northern Norway and in Greenland are proven to be not wholly worthy of confidence. Mr. Newton brings his extremely interesting history of the bird, as an inhabitant of Iceland, down to the year 1844, when the last birds known to have occurred were caught and killed; and as these may be regarded by some as the last of their race, he gives the particulars of their capture. Mr. Wolley and himself obtained many specimens of bones, but found no traces of the living birds, though he says: "I think there is yet a chance of the Great Auk still existing in Iceland."

UTAMANIA *Leach.*

Alca, Linnæus, Syst. Nat. 1758; and of most authors. Type *A. torda* L.
Diomedea, Scopoli, 1777, fide G. R. Gray. Not of authors.
Torda, Duméril, Zool. Anal. etc. 1806. Same type.
Utamania, Leach, "Syst. Cat. etc. 1816;" Steph. Cont. Shaw's Gen. Zool. xiii. 1825; and of many authors. Same type.

Size moderate; form stout, compact, heavy; head moderate, anteriorly produced, neck thick. Wings of moderate length, but fully developed, admitting

*"Lists of these, which are in the main correct, though I know of a few that are omitted, have lately appeared in the 'Zoologist' for the present year [1862], pp. 7353 and 7386, and almost simultaneously in the 'Field' newspaper (Nos. 423 and 424, pp. 93, 114). Further remarks on them will be found in the former journal (pp. 7387 and 7438)."—Newton, l. c.

of flight, reaching when folded beyond base of tail; more than twice as long as tail from carpal joint to end of longest primary. Tail rather short, pointed, of somewhat stiffened, acuminate feathers, of which the central pair are elongated and tapering. Legs short, stout; tibiæ bare for a short space above joint; tarsi compressed, anteriorly with a single row of scutellæ, posteriorly and laterally finely reticulate, shorter than the middle toe. Toes long, outer nearly equal to middle, inner much shorter; interdigital membranes broad and full; claws short, stout, obtuse. Bill about as long as head, densely feathered for half its length; feathers on upper mandible extending beyond middle of commissure, nearly as far as those on lower mandible. Bill greatly compressed, its sides flat, with several transverse sulci, its culmen ridged, regularly convex; tip of upper mandible declinate, rather acute; its base encircled by a prominent ridge; gonys about straight; commissure straight to tip, then suddenly deflected. Nostrils just above cutting edge of bill, in its feathered portion, just posterior to basal ridge, impervious, narrowly linear.

Comprising a single species, upon the varying plumages of which numerous nominal species were established by the earlier authors. The employ of the present name for the genus, instead of *Alca* of Linnæus, 1758, is perhaps defensible, upon the grounds alluded to; although the reason for the non-acceptance by authors of *Torda* of Duméril as a generic designation is not apparent. It would be easy to find, among the synonyms of the species, a trivial name to replace *Torda*, should it become necessary to use this as a patronym.

UTAMANIA TORDA, (*L.*) *Leach.*

Alca torda, Linnæus, S. N. ed. x. 1758, i. p. 130, adult. Id. ibid. ed. xii. 1766, i. p. 210; adult. Brünnich, Orn. Bor. 1764, p. 25, No. 100; adult. Gmelin, S. N. i. pt. ii. 1788, p. 551. Latham, Ind. Orn. ii. 1790, p. 793, No. 5. Donndorff, Beytr. Zool. ii. pt. i. p. 819. Scopoli, Bemerk. Naturg. i. p. 81, No. 94. Müller, Zool. dan. Prodr. p. 16, No. 136. Pallas, Zoogr. R.-A. ii. 1811, p. 360. Temminck, Man Orn. ii. 1820, p. 936. Bonaparte, Synopsis, 1828, p. 431. Audubon, Orn. Biogr. iii. 1835, p. 112; v. p. 428, pl. 214. Gould, B. Eur. v. 1837, p. pl. 401. Brandt, Bull. Acad. St.-Petersb. ii. 1837, p. 345. Peabody, Rep. Nat. Hist. Massach. 1840, ii., Birds, p. 401. Fleming, Hist. Brit. Anim. 1842, p. 130. Gray, Genera Birds, iii. 1849, p. 637. Thompson, Nat. Hist. Ireland, iii. 1851, p. 235. Bonaparte, Consp. *Gav.* Comptes Rend. 1856. Bryant, Proc. Bost. Soc. N. H. May, 1861, p. 73. Schlegel, Urinatores Mus. Pays-Bas, 1867, p. 13. Samuels, Ornith. and Oöl. of New England, 1867, p 564.

Alca (*Utamania*) *torda*, Cassin, Baird's B. N. A. 1858, p. 901.

Pinguinus torda, Bonnaterre, Ency. Method. Orn. 1790, p. 29.

Utamania torda, Leach, Stephens, Shaw's Gen. Zool. xiii. 1825, p. 27; quotes "*Alca Hoieri*, Ray, Syn. 119." Macgillivray, Hist. Brit. Birds, ii. 1852, p. 346. Coues, Pr. A. N. S. Philada. Aug. 1861, p. 249. Boardman, Pr. Bost. S. N. H. Sept. 1862, p. 131. Verrill, ibid. Oct. 1862, p. 142. Verrill, Proc. Essex Inst. iii. 1863, p. 160.

Alca pica, Linnæus, S. N. ed. xii. i. 1766, p. 210; immature or winter plumage. Pallas, Spic. Zool v. 1769, p. 12. Fabricius, Fn. Groen, 1780, No. 51. Gmelin, S. N. i. pt. ii. 1788, p. 551. Latham, Ind. Orn. ii. 1790, p. 793, No. 5; var. β and γ. Donndorff, Beytr. Zool. ii. pt. i. 1794, p. 818; quotes "*Mergus Bellonii*, Johnston, Av. p. 225." Müller, Zool. Prodr. p. 17, No. 138. Hermann, Tab. Affin. Anim. p. 225. Pallas, Zoog. R.-A. 1811, ii. p. 361.

Pinguinus pica, Bonnaterre, Ency. Method. Orn. 1790, p. 30.

Utamania pica, Leach, Stephens, Shaw's Gen. Zool. xiii. 1825, p. 30.

Alca balthica, Brünnich, Orn. Bor. 1764, p. 25, No. 101; immature, wanting white line from eye to bill. Gmelin, S. N. i. pt. ii. 1788, p. 551. Müller, Prodr. Zool. p. 17, No. 137. Donndorff, Beytr. Zool. ii. pt. i. 1794, p. 819.

Alca unisulcata, Brünnich, Orn. Bor. 1764, p. 25, No. 102; young, not having obtained full size and markings of bill.

Alca minor, Brisson, Ornithologia, vi. 1760, p. 92, No. 3, pl. 8, fig. 2.
Alca glacialis et microrhyncha, Brehm.

Habitat.—European and American coasts of the Atlantic, from the higher latitudes, in summer, to the 40°, or thereabouts, in winter. Very abundant. Specimens in all the American museums, and most private collections. Breeds in great numbers on the islands in the Gulf of St. Lawrence, and on the coasts of Labrador and Newfoundland; in winter strays south to New Jersey. Arctic seas of both hemispheres Rare, or accidental in the North Pacific. Japan! (Schlegel, Mus. Pays-Bas.)

Adult, in summer.—Iris bluish. Mouth chrome yellow. Bill, feet and claws black; the former with a conspicuous curved vertical white line occupying the middle sulcus of both mandibles, continuous from one to the other. A straight, narrow, very conspicuous white line from eye to base of culmen, composed of a series of very short stiff setaceous feathers, sunk below the level of the others. Secondaries narrowly but distinctly tipped with white. Head and neck all around, and entire upper parts black; this on the sides of the head, chin and throat lustreless, velvety, tinged with fuliginous or brownish; on the upper parts glossy and more intense in color. Inner webs of primaries light brownish-gray at base. Entire under parts from the throat, including under surfaces of wings white.

Adult in winter.—Upper parts lighter, duller, more brownish-black; the white of the under parts extending to the bill, and on the sides of the head and neck, sometimes quite to the nape.

Young, first winter—Similar to the preceding; smaller, the bill weaker, shorter, less elevated, less decurved at the tip. the culmen, rictus and gonys straighter, the sides of both mandibles smooth, except in the presence of one sulcus; bill brownish-black, the sulcus white. Legs and feet reddish or brownish-black.

Fledgelings.—Billvery small and slender; body clothed with smoky brown or black down, lighter, or tending more or less to grayish-white below.

The white stripe from the eyes to the bill is very variable, though present in the great majority of individuals. It always exists in the adults in summer plumage, but is sometimes absent in specimens, apparently perfectly adult, in winter plumage. Its presence does not seem to be amenable to any very general or constant law: since it may be very evident in very young birds, not yet fully fledged, and again absent in apparently mature specimens, as just stated. In winter specimens it is frequently interrupted and irregular, wanting the sharpness of definition which it has in all cases of adult specimens in summer vesture.

Dimensions: Adult.—Length (average) 18·00, extent about 27·00, wing 7·75, tail 3·50, difference between outer and inner feathers 1·25; tarsus 1·25; middle toe and claw 2·00, outer do. the same, inner do. 1·40; chord of culmen 1·30, its curve 1·50; rictus 2·25; gonys ·75; nostrils to tip ·85; greatest depth of bill, (just anterior to nostrils,) ·90; greatest width of the corneous portion ·30.

Young.—Length 15·00; extent 22·00; wing 7·00; tail 3·00; tarsus 1·00; chord of culmen 1 00; rictus 1·75, gonys ·60; greatest depth of bill ·60; greatest width ·20.

No one of the many synonyms of this species involves any doubtful point; all being based upon the winter plumage, or upon the absence of the white line, or upon an undeveloped condition of the bill. "Alca pica" was the most firmly established of these, having held its ground until 1825 or thereabouts.

2. Subfamily Phaleridinæ.

FRATERCULA, *Brisson.*

Alca, Linnæus, Syst. Nat. 1744; and in part of subsequent editions; and of the older authors.

Spheniscus, Moehring, Av. Gen. 1752. Not of authors.
Fratercula, Brisson, Ornith, 1760; and of many authors.
Lunda, Pallas, Zoog. R–A. 1811; in part.
Mormon, Illiger, Prodromus, 1811; and of most authors. Type *Alca arctica* L.
Larva, Vieillot, Analyse, 1816. (Type *Alca arctica* L. fide Gray).
Ceratoblepharum, Brandt, Bull. Acad. Imper. St. Petersb. ii. 1837, p. 348. Type *Alca arctica* L.

Bill rather longer than the head, or than the middle toe and claw, nearly as high at the base as long, exceedingly compressed, the sides nearly vertical, the base of the upper mandible with an elevated horny ridge, entirely surrounding it; the basal moiety of the upper mandible with its sides perfectly smooth, forming an elongated oblique triangle with two curved sides; terminal moiety with three or four deep very oblique curved grooves, from commissure to culmen, their convexity looking forwards. Under mandible without a basal ridge, the basal moiety smooth, the terminal with grooves, in continuation of those of the upper mandible. Culmen commencing on a level with the forehead, thence regularly declinate, very convex, with unbroken curve, its ridge sharp, the tip acutely pointed, overhanging. Rictus perfectly straight, except at the end; the angle of the mouth occupied by a circular callosity of membranous tissue; gonys ascending, slightly sinuate, the keel sharp, terminating posteriorly in a thin, elongated, almost hamular process. Nostrils placed just over the commissure, linear, long, reaching nearly across the base of the smooth triangular space of the upper mandible. No nasal fossæ; both eyelids furnished with prominent callosities, in one species developing into a slender acute process. No crest; a peculiar furrow in the plumage behind the eyes, as in *Lomvia*. Wings of ordinary length and shape. Tail contained two and three-fifths times in the wing; the lateral feathers slightly graduated, the central pair shorter than the next ones. Tarsus very short, only equal to the inner toe without its claw; stout, scarcely compressed, covered with minute reticulations, except for a short space in front, which is scutellate. Outer toe about equal to the middle; its claw shorter than that of the middle; middle claw much dilated on the inner edge; middle and outer claws slightly curved, not very acute, upright; inner claw very large, greatly curved, forming a semicircle, exceedingly acute, usually lying *horizontal*, not upright.*

A very peculiar, though well known genus of *Alcidæ*, without an intimate ally except *Lunda*. The essential characters lie in the structure and configuration of the bill, the rictal and palpebral appendages, and the shape and position of the inner claw; although there are other features involved. *Lunda* is crested, with no furrow in the plumage, no palpebral appendages, and a very differently shaped bill.

Three distinct species represent the genus, as far as known. They are all peculiarly boreal birds, not coming far south even in winter. One is extremely abundant on the shores of the North Atlantic; another inhabits the North Pacific exclusively; another is more particularly a denizen of the Arctic Ocean at large. They may readily be distinguished as follows:

Species, (3).

I. A slender acute upright horn on the upper eyelid. Black of throat extending to bill..... 1. *corniculata*.

* The peculiar position, no less than unusual shape of the inner claw of this genus is a strongly-marked character, not found in any other except *Lunda*. The great curvature and extreme sharpness of the claw could not be maintained were it vertically placed like the other claws, as it would be worn down by constant impaction against the rocks which the birds habitually alight upon. But in the usual attitudes and movements of the birds it lies perfectly flat on its side, and is so preserved intact. The birds make great use of this claw in digging their burrows or in fighting; and the preservation of the instrument for these purposes is evidently the ulterior design of the peculiar direction of its axis. The birds have the power of bringing it, on occasion for use, into a vertical position. These facts, mayhap, are not generally known. See Pr. A. N. S., Phila., 1861, p. 254.

II. A short blunt process on the upper eyelid. A black ring around the neck, not extending to bill.

Bill moderate; chord of culmen 2·00, the curve 2·10, the ordinate ·30; depth at base 1·40 (average), wing 6·50..... 2. *arctica.*

Bill large; chord of culmen 2·40, the curve 2·60, the ordinate ·45; depth at base 1·70 (average), wing 7·25... 3. *glacialis.*

FRATERCULA ARCTICA (*L.*) *Steph.*

Alca arctica, Linnæus, S. N. x. ed. 1758, i. p. 130, n. 3. Linnæus, S. N. xii. ed. 1766, i. p. 211, n. 3. Quotes *Anas arctica*, Clus., *Lunda*, Gesner, *Pica marina*, Ray, *Psittacus marinus*, Anders. Brünnich, Orn. Bor. 1764, p. 25, No. 103. Gmelin, S. N. i. pt. ii. 1788, p 549, No. 4. Latham, Ind. Orn. ii. 1790, p. 792, No. 3. Blumenbach, Handb. Naturg. p. 228, No. 1. Müller, Prodr. Zool. p. 17, No. 140. Hermann, Tab. Affin. Anim. p. 150. Donndorff, Beytr. Zool. ii. pt. i. 1794, p. 815.

Lunda arctica, Pallas, Zoog. R.-A. 1811, ii. p. 365, pl. 83. Schlegel, Urinatores Mus. Pay-Bas. livr. ix. 1867, p. 28. (In part. Confounds *glacialis* Leach with the present species.)

Fratercula arctica, Stephens, Shaw's Gen. Zool. xiii. 1825, p. 37. Quotes "*labradora* Gm. Lath." as syn. Fleming, Hist. Brit. Anim. 1842, p. 130. Thompson, Nat. Hist. Ireland, iii. 1851, p. 221. Gray, Gen. Birds, iii. 1849, p. 637.

Fratercula (*Ceratoblepharum*) *arctica*, Brandt, Bull. Acad. St. Petersb. ii. 1837, p. 348.

Mormon arctica, Illiger, Prodromus, 1811, p. Naumann, Isis. v. Oken, 1821, p. 783, pl. 7, figs. 5, 6, 7. Audubon, Orn. Biog. iii. p. 105, pl. 213. Oct. Ed. vii. pl. 464. Nuttall, Man. Orn. ii. 1834, p. 548. Bonaparte, Synopsis, 1828, p. 430. Peabody, Rep. Nat. Hist. Mass. 1840, ii. Birds, p. 401. Macgillivray, Hist. Brit. Birds, 1852, ii. p. 365. Coues, Pr. A. N. S. Phila. Aug. 1861, p. 251. Boardman, Pr. Bost. Soc. N. H. Sept. 1862, p. 131. Verrill, Proc. Bost. Soc. N. H. Oct. 1862, p. 142. Verrill, Proc. Essex Inst. iii. 1864, p. 160. Samuels, Ornith. and Ool. of New England, 1867, p. 566.

Mormon (*Fratercula*) *arctica*, Bonaparte, Comptes Rendus, Apr. 1856, p. 774. Cassin, Birds N. A. 1858, p. 903.

Mormon fratercula, Temminck, Man. Orn. ii. p. 933. Gould, Birds Europe, v. 1837, p. pl. 403.

Mormon polaris et Grabæ, Brehm.

Alca deleta Brünnich, Orn. Bor. 1764, p. 25, No. 104. Young.

Alca labradorica, Gmelin, S. N. i. pt. ii. 1788, p. 550, No. 6. Based upon the "Labrador Auk" of Pennant, A. Z. 1785, ii. p. 512, No. 428;* and Lath. Syn. iii. i. p. 318, No. 4. "Hab. in terra Labrador; *Arcticæ* magnit. 12 ferè poll. long. Rostr. angustum, mand. sup. obscurè rubra, inf. albida nigro maculata; tempora obscurè alba, gula, alæ, et cauda brevis obscuræ, pedes rubri." Bonnaterre, Ency. Method. Orn. 1790, p, 33. Donndorff, Beytr. Zool. ii. pt. i. 1794, p. 817.

Alca labradora, Latham, Ind. Orn. ii. 1790, p. 793, No. 4. Same basis as that of Gmelin. "Rostro carinato, mand. inf. gibba, ad apicem macula nigra, oculorum orbita temporibusque albidis, * * color corporis ferè ut in arctica," etc.—Not *Sagmatorrhina labradora* Cassin, which is *S. Lathami* Bp.

Spheniscus, Moehring, Av. Gen. 1752, p. 62, No. 64. Based on "Colymbi species et Alcæ species" of Linnæus' sixth edition. "Rostrum subouatum, lateri-

*The following is Pennant's description:—"With the bill an inch and a quarter long, much carinated at top, not very deep, a little convex; upper mandible dusky, lower whitish, marked with a black spot, and angulated like that of a gull; crown and upper part of the body, wings and tail, dusky; lower part white; legs red. Size of the former," (*Arctica.*) "Inhabits the Labrador coast?—Br. Mus."

bus angustissime et perpendiculariter compressis, cutis callosa dura in basi mandibuli superioris. Ad supercilia cornu breue," etc.

Coasts and Islands of the North Atlantic, very abundant. Rare in the North Pacific, (Pallas,) where replaced by *F. corniculata.* In winter, south on the American Coast to Massachusetts. Breeds on the islands in the Bay of Fundy, (Boardman). Numerous specimens in all American Museums.

Adult (breeding plumage.)—Iris hazel brown. Eyelids vermillion red, the fleshy callosities bluish ash. Base of bill and first ridge dull yellowish, the smooth contained space bluish, rest of bill vermillion red, the tip of the lower mandible and the two terminal grooves yellowish. Legs and feet coral red, claws black. Crown of head grayish black, the edges of which are sharply defined against the color of the sides of the head, chin and throat, and the posterior edge of which is separated by a very narrow but distinct transnuchal stripe of ashy from the color of the back. Sides of head, with chin and throat ashy white; nearly white between the eyes and bill, and with a maxillary stripe or area of blackish ash on either side of the throat. A narrow, distinct line of white along the anterior edge of the antibrachium. Entire upper parts glossy black, with a bluish lustre, continuous with a broad collar of the same around the sides and front of the neck. Under parts from the neck pure white, the elongated feathers of the flanks and sides blackish. Under surface of wings pearly ash-gray; inner webs of primaries and secondaries dull gray-brown, the shafts brown, blackish at tip and whitish towards the base.

Length 13·50, extent 24·00, wing 6·50, tail about 2·25; tarsus 1·00; middle toe 1·40, its claw ·40; outer toe 1·40, its claw ·30; inner toe 1·00, its claw ·40; bill—chord of culmen 2·00, its curve 2·10; depth of bill at base 1·40; rictus 1·25; gonys 1·45: greatest width of bill (which is at base of nostrils) ·60; length of nasal slit ·35.

Young.—Bill much smaller and weaker than in the adult; without the basal ridge, and with only slight indications of the warty callosities at angle of rictus; the terminal grooves wanting, or faintly indicated; the culmen much less convex; the gonys convex and ascending posteriorly, without the sharp hamular process at base. Such are the general characteristics of the young, though full-grown bird. Birds not grown have their bill much smaller still, entirely without grooves or ridges, acute at the apex, the culmen and gonys perfectly straight; the lateral aspect of the bill is almost an equilateral triangle. Bill basally blackish; terminally yellowish. Legs and feet reddish yellow, obscured with dusky. The eyelids want the fleshy processes. In colors of plumage the young birds are almost exactly like the parents, except that the ashy of the sides of the head is tinted with sooty black, more or less directly continuous with the black of the crown, and lightening into a dusky ash on the auriculars and lower parts of the sides of the head.

Nestlings are covered with blackish down, becoming whitish on the under parts from the breast backwards.

This species presents little variation in any respect from the conditions as above described. The dimensions do not vary much, and even the bill is very constant in size, shape and colors. The plumage of the adults scarcely presents appreciable variation.

The protuberance on the lower eyelid is horizontal, and occupies the whole length of the lid. That on the upper eyelid is nearly perpendicular, and higher than broad; but is short, obtuse and never developed into an acute process.

There is absolutely no difference between American and European specimens. The foot note on page 251, Pr. A. N. S. Phila. for 1861, is to be cancelled as wholly erroneous.

No bird of the family of *Alcidæ* is better known than the present species. It is the type of the Linnæan genus *Alca* of 1744, but not of 1758, nor of subse-

quent editions of the "System." Though so long known, it has few synonyms beyond those resulting from its reference to divers genera. Alca "deleta" Brünnich, is the young bird. So also, beyond a doubt, is the Alca "labradorica" of Gmelin, which has been so differently interpreted by various authors. Bonaparte even says it is *certainly* his *Sagmatorrhina Lathami*, though he does not adopt the name *labradora*, as it would imply a geographical error. Mr. Cassin, however, uses it in connection with the *Sagmatorrhina*. It is based upon the "Labrador Auk" of Pennant. The diagnosis of this author, and that given by Gmelin and Latham, are reprinted above, for facility of reference. If the reader will take the trouble to study these three descriptions, he will not be likely to regard them as diagnoses of *Sagmatorrhina Lathami*.

This species is the type of Moehring's genus *Spheniscus ;* and a person addicted to iconoclasm in the matter of nomenclature might cut a fine dash on the strength of this fact.

FRATERCULA GLACIALIS, *Leach.*

Mormon glacialis, "Leach," Naumann, Isis, 1821, p. 782, pl. 7, fig. 2. Not of Audubon and Gould, who figure and describe *corniculata*. Newton, Ibis, 1865, p. 212. Malmgren, Cab. Journ. f. Ornith. xiii, 1865, p. 394; critical discussion of relationships to *arctica*.

? Mormon glacialis, Bonaparte, Synopsis B. U. S. 1828, p. 429. Probably only *arcticus*. Boardman, Pr. Bost. Soc. Nat. Hist. Sept. 1862, p. 132; and Verrill, Proc. Essex Inst. iii, 1864, p. 160. Grand Menan, Bay of Fundy. These two authors rely for the locality upon Audubon's authority, very questionable in this instance.

Fratercula glacialis, Leach, Stephen's Cont. Shaw's Gen. Zool. xiii, 1825, p. 40, pl. 4, fig. 2. Gray, Genera Birds, iii, 1849, p. 637.

Mormon (*Fratercula*) *glacialis*, Bonaparte, Tab. Comparatif Pelagiens, Comptes Rendus, xlii, 1856, p. 774. Cassin, Baird's B. N. A. 1858, p. 903.

Lunda arctica, Schlegel, Urinatores Mus. Pays-Bas, ix. livr. 1867, p. 28, in part; "Specimina aliquantulum majora ex insula Spitzbergen."

Coasts of the North Atlantic; but a more boreal species than *F. arcticus;* Arctic Ocean. Spitzbergen. Near Port Foulke, Greenland, (Mus. Smiths. Inst.), "Europe," Greenland, (Mus. Acad. Philada.) Not authenticated as occurring on the coast of Maine.

(No. 24,302, Mus. Smiths., near Port Foulke, Greenland, Aug., 1861; adult; Dr. I. I. Hayes.) With the colors, and much the general aspect of *F. arcticus*. Larger than that species. Protuberance on upper eyelid more decidedly acicular; in fact intermediate in size and pointedness between that of *F. arctica* and *F. corniculata*. Bill much larger, comparatively and absolutely, than that of *arctica*, and differently shaped; its colors about the same. Bill very deep at the base, the basal ridge rising high on the forehead; culmen much arched, towards the end dropping nearly perpendicularly downwards, so great is its convexity. Upper mandible with four decided grooves; the lower with three, being one more on each than is usual in *arctica*. Gonys more convex in outline, yet not produced posteriorly into so acute a hamular process. Length 14·50; extent about 26·00; wing 7·25; tail 2·25; tarsus 1·20; middle toe and claw 1·90, outer do. 1·90, inner do. 1·45; bill: chord of culmen 2·40, its convexity 2·60, ordinate of the curve ·45; depth of bill at base 1·70, length along rictus 1·50, along gonys 1·60; greatest width of bill ·65; length of nasal aperture ·40.

The developement of the bill, changes of plumage, and individual variations of this species are doubtless identical with those of *arctica*. Young birds of the two species might not be satisfactorily distinguishable.

Though this species is so very near *arctica* it is probable that the majority of authors would accord to it specific rank. It is apparently larger in all its parts; the callosity on the upper eye-lid tends in shape towards that of *corniculata;* the bill is not only much larger every way than that of *arctica*, but has

a decidedly different shape, owing chiefly to its greater depth at base, as compared with its length, and much greater convexity of culmen. The only questionable relationship is with *arctica;* the bird is certainly not *corniculata.*

This species is usually cited by New England writers as occurring off the coast of Maine in winter. (Grand Menan, entrance of the Bay of Fundy.) In this, however, they only quote Audubon's authority, which is not reliable in this instance, as he himself says that he "rather supposed than was actually certain that the birds observed were large-billed Puffins." The case is rendered still more problematical by the fact that Audubon's "Large-billed Puffin, *Mormon glacialis* Leach," is really the *corniculata* Naumann, described and figured from specimens procured in London, from Mr. Gould, who also, in the "Birds of Europe," mistakes the true *glacialis* Leach for *corniculata* Naumann Subsequent writers will do well to expunge the name of this species from their local lists of the birds of New England. It is exceedingly improbable that the true *corniculata* occurs on the New England coast.

This species is usually cited as having been introduced in Stephens' Continuation of Shaw's General Zoology (1825); but must have appeared some years previous, since Naumann quotes "*Mormon glacialis* Leach," in the Isis, 1821. It was probably named by Leach about 1816–18.

Fratercula corniculata, (*Naumann*), *Gray.*

Mormon corniculata, Naumann, Isis v. Oken, 1821, p. 782, pl. 7, figs. 3, 4. (Kamtschatka.) Cassin, Pr. A. N. S. Philada. 1862, p. 324. (Behring's Straits.)

Mormon (*Fratercula*) *corniculata*, Bonaparte, Comptes Rendus, 1856, p. 774. Cassin, Baird's B. N. A. 1858, p. 902.

Fratercula corniculata, Gray, Gen. Birds, iii, 1849, p. 637, pl. 174.

Fratercula (*Ceratoblepharum*) *corniculata*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 348. Quotes "*Mormon corniculatum*, Kittlitz, Kupfer, i."

Mormon glacialis, Audubon, Orn. Biogr. iii, 1835, p. 599, pl. 293, fig. 1. Id. B. Amer. vii, p.——, pl. 463. Not of authors. Gould, Birds Eur. v, 1837, pl. 404. Not of authors.

? Fratercula glacialis, Vigors, Zool. Voy. Blossom, 1839, Ornith. p. 33. Probably not true *glacialis.*

Lunda corniculata, Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 28.

Coasts and Islands of the North Pacific and Arctic oceans. Kamtschatka, (Mus. Acad. Phila.) Sitka, (Schlegel, Mus. Pays-Bas.) Kotzebue Sound, and St. Michael's, Russian America, (Mus. Smiths. Inst.) Southern extension on west coast of America not determined. Not recorded from the North Atlantic.

Adult, breeding plumage. (No. 46,503, Mus. Smiths., St. Michael's, Russian America, June 27, 1866; H. M. Bannister.) Bill very large, especially high at the base for its length, the height being about equal to the chord of the culmen, exclusive of the width of the basal rim; base of culmen and angle of gonys both produced far backward, giving a greatly curved outline to the base of the bill along the feathers of the sides of the head; sides of the bill not distinctly divided into two compartments; nearly plane and smooth in their entire length, with only three faintly pronounced short grooves; culmen exceedingly convex, regularly arched in the arc of a perfect circle; the tip of the upper mandible acute, moderately overhanging, the basal rim broad and prominent; rictus (not including the part beyond the basal rim of the upper mandible) very short, only equal to the height of the upper mandible at base; gonys sinuate, at first convex in outline, then slightly concave; its length but little less than the chord of the culmen.*

Appendage of the upper eye-lid produced into a long, slender, acutely pointed

* The lower mandible in this specimen is so thin near the angle of the gonys as to be transparent. Ordinary type can be read through it.

upright spine; that of the lower eye-lid much as in other species of the genus.

Form otherwise as in *F. arctica* and *glacialis*. Larger than the former, about the size of the latter.

Crown of the head deep grayish black; the patch of this color triangular in shape, narrowing anteriorly to a point at the base of the culmen. Sides of the head white; the furrow in the plumage behind the eye, and the sides of the lower jaw tinged with dark ash. A narrow distinct line of white along the edge of the fore-arm. Entire upper parts very glossy blue-black; a duller, more fuliginous shade of black encircling the neck before, and running forwards on the throat and chin quite to the bill. Other under parts pure white, except a few elongated blackish feathers on the sides and flanks. Under surface of wings dark pearly ash. Legs and feet orange red, the webs tinged with vermillion. Claws brownish black. Palpebral appendages apparently ashy black. Bill yellow, tinged with red, the terminal portion blackish. Rictal callosities brilliant yellow orange.

Length 14·50; extent 24·50; wing 7·25; tail 2·75; tarsus 1·10; middle toe and claw 2·00; outer do. 1·90; under do. 1.35; bill: chord of culmen 2·00, its curve 2·25; rictus from basal rim to tip 1·20; gonys 1·75; depth of bill at base 1·80; its greatest width ·60; length of nasal slit ·40; length of superior palpebral appendage ·35.

This interesting species may be recognized at a glance by the prominent horn over the eye, and the extension of the black collar on the throat to the bill. The bill also differs from that of either of the other species in its shortness, compared with its great depth at the base, and the nearly smooth sides, which are not distinctly divided by a ridge or groove into two compartments. The bill is also comparatively thinner than that of the other species, and differently colored.

Prof. Naumann first described this species from Kamtschatka in his valuable memoir on the genus in the Isis, as above cited. It has been occasionally confounded with *glacialis* Leach, which is quite a different bird. It is a North Pacific and Arctic species, not recorded from the Atlantic. Excellent specimens are contained in the Philadelphia Academy and Smithsonian Institution; one of those in the collection of the last named is probably the original of Audubon's plate of "glacialis."

LUNDA, *Pallas.*

Alca, Pallas, Spic. Zool. v, 1769; in part; and of some older authors.
Lunda, Pallas, (ex Gesn.) Zoog. R.-A. 1811. Type *Alca cirrhata*, Pallas.
Mormon, Illiger, Prodrome, 1811; in part; and of most authors.
Fratercula, Stephens, Shaw's Gen. Zool. xiii, 1825; in part; not of Brisson.
Gymnoblepharum, Brandt, Bull. Acad. Imper. St. Petersburg, ii, 1837, p. 349. Type *Alca cirrhata*, Pallas.

With somewhat the general aspect of *Fratercula*. No horny appendages to the eyelids. No furrow in the plumage behind the eyes. An extremely elongated crest on each side of the head. Upper mandible with only an indication of a basal ridge along its sides; the culmen divided into two parts, whereof the basal is surmounted by a prominent widened ridge, ending abruptly; sides of upper mandible with three well marked curved grooves, widely separated, whose convexity points backwards. Under mandible with its sides perfectly smooth, and its base very convex, not concave. Rictus very sinuate; gonys slightly curved. Feet, wings and tail as in *Fratercula*.

The above diagnosis indicates only the principal features wherein this genus—or subgenus, as might be contended with some reason—differs from *Fratercula*. Except in the bill, eye-lids and crest, the genus is exactly *Fratercula*, but the differences in these points seem sufficient to warrant generic separation.

LUNDA CIRRHATA, *Pallas.*

Alca cirrhata, Pallas, Spic. Zool. 1769, v, p. 7, pl. 1, and pl. 2, figs. 1, 2, 3. Quotes Steller, Nov. Comm. Petrop. iv, p. 421, pl. 12, fig. 16. Gmelin, S. N. i, pt. ii, 1788, p. 553. Quotes Pennant, A. Z. ii, p. 513, No. 432. Latham, Ind. Orn. ii, 1799, p. 791, No. 2. Donndorff, Beytr. Zool. ii, pt. i, p. 822, No. 10. Quotes *Anas arctica cirrhata*, Steller. Sander, Grösse u. Schönh. in Natur. i, p. 244. Hermann, Tab. Aff. Anim. p. 150; and of the other early authors.

Lunda cirrhata, Pallas, Zoog. R.-A. ii, 1811, p. 363, pl. 82. Schlegel, Urinatores Mus. Pays-Bas, 1867, p. 27.

Mormon (*Lunda*) *cirrhata*, Bonaparte, Comptes Rend., 1856, p. 774. Cassin, Baird's B. N. A. 1858, p. 902.

Mormon cirrhata, Bonaparte, Syn. 1828, p. 429. Audubon, Orn. Biogr. iii, 1835, p. 36; pl. 249, figs. 1, 2. (Kennebec R., Me.) Audubon, B. Amer. vii, 1844, p. ——, pl.—. Boardman, Proc. Bost. Soc. N. H. 1862, p. 132. (Maine). Verrill, Proc. Essex Inst. iii, 1864, p. 160. (Maine). Heermann, Pac. R. R. Rep. x, 1859, Route to California, Birds, p. 75. Cooper and Suckley, Pac. R. R. Rep. xii, pt. ii, 1859, p. 283.

Mormon cirrata, Naumann, Isis, 1821, p. 781, pl. 7, fig 1.

Fratercula cirrhata, Stephens, Shaw's Gen. Zool. xiii, 1825, p. 40. Vieillot, Gal. Ois. ii, 1825, p. 240, pl. 296. Vigors, Zool. Voy. Blossom, Ornith. 1839, p. 33. Gray, Gen. Birds, iii, 1849, p. 637. Cassin, Pr. A. N. S. Phila. 1862, p. 324.

Fratercula (*Gymnoblepharum*) *cirrata*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 349.

Arctic Ocean; Coasts and Islands of the North Pacific; on the American side south to California; of occasional occurrence on the Atlantic Coast of North America, (Kennebec River, Audubon: spec. obtained; Bay of Fundy, in winter, Verrill,) Spec. in Mus. Acad. Philada., Mus. Smiths., Cab. Geo. N. Lawrence, author's Cab., etc.

Bill very large and heavy, much longer than the head or middle toe and claw, its depth at base three-fourths its length; excessively compressed, the sides nearly perpendicular, except at base of upper mandible, where they bulge a little. Upper mandible divided into two portions; the basal part with its sides perfectly smooth, bounded along the base by a slight oblique ridge of subcorneous tissue, which is scarcely, however, elevated above the common plane, and is minutely studded with points; bounded above by a prominent wide ridge formed of an accessory corneous piece which surmounts this portion of the culmen; bounded below by the nasal slit; bounded anteriorly by a deep groove whose convexity looks backwards; these four boundaries enclosing a subtrapezoidal space. The terminal part smooth, except in the presence of three widely separated, oblique, curved, deep grooves, whose convexity looks backwards. Lower mandible with the sides perfectly smooth, the base convex, the convexity looking backwards, with slight indication of a ridge of punctulated subcorneous tissue. General outline of culmen convex; this convexity, however, interrupted near the middle by a notch, forming a reentrant angle between the two parts of the culmen, each of which, taken separately, is convex in outline—the anterior part the most so. Rictus exceedingly sinuate, the tip of the upper mandible being almost perpendicularly hung over that of the lower; the angle of the mouth occupied by a large fibrous or membranous excrescence, nearly circular in outline, turgid in life; in the dry state shrunken and minutely punctulated. This peculiar warty excrescence seems of nearly the same structure as the base of the bill itself, with which it is directly continuous. Nasal slit short, linear, subbasal, placed close to the commissural edge of the upper mandible. Palate and floor of mouth both deeply excavated; the cutting edge of both mandibles exceedingly sharp.

The eyelids are naked along the edge, but present no thickening or unusual

fleshiness. The crest springs chiefly from what would otherwise be a naked linear groove in the plumage from the eyes to the extreme occiput. Some of the feathers begin to grow much above, if not a little anterior to, the eyes. The crest in perfectly adult birds is more than *four* inches long. The feathers have exceedingly slender, delicate shafts, and loose, entirely disconnected, though quite lengthy fibrillæ; and a peculiar silky glossiness.

The wings are of the usual size and shape in this family. The tail is comparatively somewhat longer, perhaps, than in any other Alcidine bird; the lateral feathers a little graduated; the central pair shorter than the next, producing an emargination. The legs are as in *Fratercula*. The claw of the inner toe presents the curious character which has already been dwelt upon in connection with *F. arctica*.

Adult.—Bill orange-red; the basal moiety of both mandibles livid horn or enamel color; the punctulated basal ridge, and rictal callosities more yellowish. Legs and feet obscure reddish; the webs bright coral red; claws brownish-black. Edges of eyelids red; "iris pale blue." Crests pale straw-yellow; some of the posterior feathers, which grow from the black part of the head, black at base. Face pure white, abruptly defined. This white occupies the lores and sides of the head to the base of the crest, and encircles the bill, broadly on the sides, narrowly above and below. The black of the crown comes down the forehead to within a fourth of an inch of the culmen; just filling the crown between the crests, and ending with a directly transverse outline. The white on the side of the lower jaw extends to within about the same distance from the under mandible. A narrow, very distinct pure white line along the anterior edge of the fore-arm. Entire upper parts, and under tail coverts glossy black; sides of head and neck, and throat and breast fuliginous brownish-black; other under parts the same, but more grayish; under surfaces of wings smoky gray. Wings and tail black; the inner webs of the feathers brownish-black; the shaft of the first primary whitish on its under surface towards its base.

The preceding description is taken from an unusually fine specimen (No. 46,494, Mus. Smiths. ♂, Sitka, May, 1867), representing the very highest condition of maturity. The crest is more than four inches long. It is not often that such very perfect specimens are met with in collections.

Length between 15·00 and 16·00; wing 7·75; tail about 2·00; tarsus 1·30; middle toe 2·00, its claw ·50; outer toe 1·80, its claw ·40; inner toe 1·25, its claw ·50; bill: greatest depth (a little in front of extreme base) 1·90; greatest width (at angle of mouth) ·90; chord of culmen 2·40, of which the terminal portion is 1·40; rictus about 1·90; gonys 1·60; greatest depth of upper mandible 1·15; nostrils ·25 long.

Young (*full grown*).—Bill smaller than in the adult, and not so deep at the base; sides of terminal moiety of upper mandible perfectly smooth; chord of culmen 2·00; depth of bill at base 1·40. No crest; slight indications of it in some short yellowish filamentous feathers on the auriculars. White line on fore-arm imperfect. White about head as in the adult; but the black reaches nearly or quite to the base of the culmen and gonys. Otherwise like the adult; the under parts rather more grayish. The bill and feet appear to have been less brightly colored.

This strange bird fairly disputes with *Phaleris psittacula* the claim to be regarded as the oddest of the odd species of this family. The peculiar configuration of the bill strongly characterizes it at all ages, independently of its remarkable head-markings. Though known for about a century, it has received no specific synonyms from any of the writers whose works have been examined in the preparation of the present memoir. Specimens are contained in nearly all the American collections. The bird is authenticated as occurring on the coast of Maine.

CERATORHYNCHA, *Bonaparte.*

Alca, Pallas, Zoog. R.-A. ii, 1811, in part; not of authors.
Phaleris, Bonaparte, Zool. Journ. iii, 1827; not of authors.
Cerorhinca,* Bonaparte, Syn. U. S. Birds, 1828. Type *C. occidentalis*, Bp. = *A. monocerata*, Pall.
Chimerina, Eschscholtz, Zool. Atlas, 1829. Type *C. cornuta*, Esch. = *A. monocerata*, Pall.
Uria, Audubon, B. Am. vii, 1844, in part; not of authors.
Simorhynchus, Schlegel, Mus. Pays-Bas, 1867, livr. ix, in part; not of Merrem.

Base of upper mandible with a large upright horny protuberance. Under mandible with an accessory corneous piece interposed between its rami, near their symphysis. Bill shorter than the head, stout, very deep at the base, tapering rapidly to the tip, much compressed, the sides erect, smooth, the culmen very convex, the rictus gently curved, the gonys nearly straight, except at symphysis, where it is bulging. Nostrils short, linear, subbasal, marginal, impervious. Eye small; no palpebral appendages. No crest; no furrow behind the eyes; slender elongated feathers on each side of the head. Inner lateral claw of usual size, shape and position. Other details of form almost exactly as in *Fratercula*. Size large; general form robust.

This curious genus may readily be distinguished from all others of the family by the characters indicated in the two first sentences of the above diagnosis. The intercalation of an accessory corneous element at the mandibular symphysis is an entirely unique feature in this family. It seems very much like the "interramicorn," as the writer has elsewhere called it, which is found in the albatrosses, as one of the characters which distinguish those birds from other *Procellariidæ*. In the present instance, it is a feature of especial importance and value, as it helps greatly to distinguish this genus from *Sagmatorrhina*, or, to be more explicit, to separate *S. Suckleyi* from *C. monocerata* in every stage of growth.

The affinities of this genus are decidedly with *Fratercula*, after *Sagmatorrhina*, of course. Aside from the peculiarities of the bill, it agrees with the former in most points of structure, except the eyes and inner lateral claw. It does not require comparison with any other genus. It is represented by only a single species, according to the writer's way of thinking,—*Suckleyi* falling most naturally, as well as can be judged at present, in *Sagmatorrhina*.

CERATORHYNCHA MONOCERATA (*Pall.*) *Cass.*

Alca monocerata, Pallas, Zoog. R.-A. ii, 1811, p. 362, No. 414.
Cerorhina monocerata, Cassin, Baird's B. N. A. 1858, p. 905. Cooper and Suckley, Pacific R. R. Rep. xii, pt. ii, 1859, p. 284.
Simorhynchus monoceratus, Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 26. Cites *Sagmathorina* [lege Sagmatorrhina] *Lathami* Bp. and *Cerorhina Suckleyi* Cass. as young.
Phaleris cerorhynca, Bonaparte, Zool. Jour. iii, 1827, p. 53.
Cerorhinca occidentalis, Bonaparte, Syn. Am. Birds, Ann. Lyc. N. Y. iv, 1828, p. 428. Nuttall, Man. ii, p. 538. Vigors, Zool. Voy. Blossom, 1839, Ornith. p. 33.
Ceratorhyncha occidentalis, Bonaparte, Comp. List, 1838, p. 66. Bonaparte, Consp. Gav. Comptes Rendus, 1856, xlii, p. 744.
Ceratorhina occidentalis, Audubon, Orn. Biog. 1839, v, p. 104, pl. 402, fig. 5.
Cerorhina occidentalis, Gray, Genera Birds, iii, 1849, p. 639. Heermann, Pac. R. R. Rep. x, 1859, Route to California, Birds, p. 75.
Uria occidentalis, Audubon, B. Am. vii, 1844, p. 364, pl. 471.

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* This word is spelled in a great variety of ways, both by Bonaparte himself, and other authors. We find Cerorhina, Cerorrhina, Ceratorhina, Ceratorrhina, Cerorhinca, Cerorhynca, Cerorhyncha, Ceratorhyncha, Ceratorrhyncha, etc. The orthography above cited is that apparently first given by Bonaparte, but is obviously erroneous.

Cerorhina orientalis, Brandt, Bull. Acad. St.-Petersb. ii, 1837, p. 348. By a lapsus calami for "occidentalis."
Chimerina cornuta, Eschscholtz, Zool. Atlas, 1829, iii, p. 2, pl. 12.

American and Asiatic coasts and islands of the North Pacific. Japan (Perry's U. S. Expl. Exped.), Kamtschatka (Mus. Acad., Philada.), Pacific coast of N. A. from Russian America to Farralone Islands, Cal. (Mus. Smiths. Inst.) Breeds as far south as Japan and California.

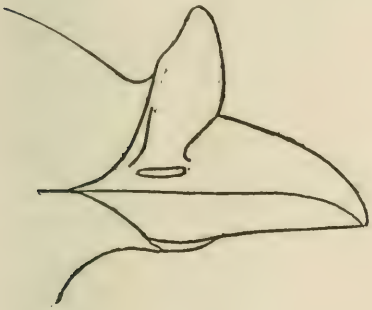

Fig. 1.—*C. monocerata.*
Nat. size. Adult female.

Fig. 2.—*C. monocerata.*
Nat. size. Young scarcely fledged.

Adult, breeding plumage, (No. 46,517, Mus. Smiths. ♀, Sitka, May, 1866).—Bill orange-yellow, culmen and base of upper mandible dusky; horn dull yellowish. Feet apparently dusky yellow; below, with the tarsi posteriorly, blackish; claws black. Crown of head, back of neck, and entire upper parts glossy blue-black. Sides of head and neck, and of body along under the wings to the flanks, with chin, throat and upper part of breast, and under surfaces of wings, clear grayish ash, pretty trenchantly defined along its line of junction with the black. Under parts from the breast pure white; this color shading insensibly into the ashy on the breast and sides. A line of white along the edge of the fore-arm. Exposed portions of wing and tail feathers black; their inner webs greyish-brown, basally lighter, the shafts of the primaries dull whitish at base. A series of elongated, stiffish, acicular feathers on the side of the head from the rictal angle; another similar series from the eye backwards to the sides of the nape, pure white. The individual feathers are about an inch, more or less, in length; the length of the white stripes produced by them collectively is about two inches.

Length 15·50; wing 7·25; tail 2·50; tarsus 1·20; middle toe and claw 1·85, outer do. 1·70, inner do. 1·40; chord of culmen, excluding width of horn, 1·00, including it 1·40; rictus 2·00; gonys, including length of accessory piece, 1·10; height of bill from tip of horn to protuberance at symphysis 1·25; from culmen at base of horn to same ·80; nostril to top of horn ·75.

Immature, but with a perfectly developed horn, and accessory symphyseal piece (No. 23,391, Mus. Smiths., Straits of Fuca).—Colors somewhat as in the preceding; but the white of the under parts everywhere obscured by ashy-gray, which tinges the tips of the feathers, giving a marbled aspect to the parts, lightest on the middle of the belly, shading insensibly on all sides into the uniform ashy-gray of the other under parts. Black of upper parts, especially on the head, with a decided brownish tinge. Only traces of the acicular white feathers on the sides of the head. Bill smaller than before; the horn, however, perfectly developed, rising nearly half an inch above the culmen. Rather

smaller than the preceding; length between 14 and 15 inches, wing barely 7, bill along rictus 1·60, its depth at base, exclusive of height of horn, ·65.

Young. (No. 23,392, Mus. Smiths., Straits of Fuca).—This specimen is just not quite fully feathered, patches of down adhering here and there. The bill is small and weak, hardly more than half the size of that of the adult; its general shape, however, is nearly attained. The base of the upper mandible is covered with a soft skin, about as far as the end of the nostrils. That part of the culmen formed by the ridge of this skin is sunken below the level of the rest. Unmistakable indications of the future horn are present, in a small knob on the ridge of this skin. In the present dried state this knob is shrunken, presenting the appearance represented in the plate. In life it was probably a small full rounded protuberance, rising a little above the level of the culmen. Between the mandibular rami, at the symphysis, there is a slight fold or ridge of skin, evidently the matrix of the future accessory corneous element. The upper mandible is mostly blackish; the lower dull obscured reddish. The legs and feet appear to have been colored much like those of the adult. The colors of the plumage are precisely those of the specimen last described; the patches of down are smoky brown. There is no trace of white about the head.

Nestling, about 5½ inches long. (Farralone Islands. Mus. Acad. Phila.) All over smoky brown, lighter and more grayish below.

The horn of this bird, always present in the adult, and always indicated, even in the scarcely feathered young, as we have just seen, varies a great deal in the details of its size and shape. It is usually nearly upright, but frequently projects a little obliquely forward. Its average height is between four and five-tenths of an inch, measuring from the level of the culmen at the anterior edge of the root of the horn. The real roots of the horn begin a little above the nasal aperture; the nostril opening just beneath the lower edge. The horn is thus bifurcated, as it were, at the base, and saddled on the base of the upper mandible. The anterior outline is usually straight, or slightly curved, the apex rounded, and the posterior border irregular in outline. The figure represents what is perhaps an average horn. It would be impossible to indicate all the variation in detail; scarcely two horns are precisely alike.

The frontal feathers ascend a very little way up the back of the horn in the majority of instances; sometimes, however, they end abruptly at its base. From their foremost point they sweep downwards and backwards along the side of the upper mandible with a gentle regular curve, to the rictal angle, leaving the tomial edges of the upper mandible bare. The chin feathers begin at the accessory symphyseal piece, rise quickly on the sides of the under mandible, and reach its tomial edge in advance of the rictal angle.

The symphyseal piece, which is developed from the skin at the apex of the interramal space, is, when fully formed, as hard as the rest of the bill. Anteriorly it is directly continuous with the mandibular symphysis. On its sides, a groove indicates its line of cohesion with the mandibular rami. The horn, when mature, is perfectly corneous and hard to its extreme base; there being no soft skin even about the nostrils. Its main shaft is hollow; a tube is disclosed when the top is worn off or broken off.

The white feathers on the side of the head differ from those of other Phaleridines (except *S. Suckleyi*) in not being very slender, filamentous and wavy. They are straight, short, acutely pointed, stiffish, standing discreet from each other, like so many narrow spear-points.

The very large series of this bird examined warrant the belief that the horn is always present, accidents of course not considered; that it begins to be apparent even before the bird is fully fledged, as a slight knob. That, in like manner, the accessory symphyseal piece is always developed; and that its beginning may be detected at a very early age. These facts must be borne in mind in discussing the unusually interesting points connected with *Sagmatorrhina* as compared with the present genus. The opinion relative to the season-

al or sexual character of the horn (page 905, Birds of N. A.)* would probably not have been expressed, had the writer enjoyed the opportunity of examining such an extensive series as have been at command in the preparation of the present monograph.

This species was first named Alca *monocerata* by Pallas in 1811. Prince Bonaparte called it "Phaleris occidentalis" in 1827; which name has been usually adopted, Pallas' description being overlooked or disregarded. Brandt appears to have accidentally misquoted Bonaparte's name in calling the bird "Cerorhina orientalis, Bp." Eschscholtz called it "Chimerina cornuta" in 1829. These are the only synonyms which the writer has been able to collate, except, of course, those resulting from the reference of the bird to diverse genera, as has been already noted.

SAGMATORRHINA, *Bonaparte.*

Sagmatorrhina, Bonaparte, P. Z. S. Lond. 1851, p. 202. Type *S. Lathami*, Bp.

"Bill twice as long as high, upper mandible straight at the base, covered with a very large cere, incurved at the tip; lower mandible ascending immediately beyond the middle, forming an obtuse angle; nostrils linear, marginal."—Bp. l. c.

The above is a translation of the diagnosis of a genus framed by Bonaparte for the reception of a bird he calls *S. Lathami*. It apparently differs from *Ceratorhyncha* in the contour of the bill, the presence of a soft cere saddled on the base of the upper mandible in the place of a horn, and, it may be presumed, in the absence of the peculiar accessory corneous element at the mandibular synphysis, as no mention is made of such a character. The type and apparently only known specimen is in the British Museum.

The possession of a soft flat cere in place of an upright horn, and the want of the accessory mandibular piece are precisely the features which characterize *Cerorhina Suckleyi* Cassin; and in fact are about the only ones by which the latter can satisfactorily be distinguished, specifically, from *C. monocerata*. It therefore seems a procedure of obvious propriety to refer *Suckleyi* to the present genus. At the same time *Suckleyi* can by no possibility be confounded with *Lathami*; nor is the latter by any means a young *C. monocerata*, as some authors have ventured to hint, and others have boldly assumed. An inspection of the figures accompanying the present memoir ought to set all doubts at rest.

Species—(2.)

"Length 16 inches; wing 7·50; bill 2 long, 1 high, five-eighths wide at the base" ..... 1. *Lathami.*

Length 14·50; wing 6·50; bill along culmen 1·30, depth at base ·60, width at base four-eighths ..... 2. *Suckleyi.*

SAGMATORRHINA LATHAMI, *Bonaparte.*

? ? ? *Alca labradoria*, Gmelin, S. N. i, pt. ii, 1788, p. 550. Very doubtful. Rather referable to *Fratercula arctica*, which see.

Sagmatorrhina labradoria, Cassin, Baird's B. N. A. 1858, p. 904.

Sagmatorrhina Lathami, Bonaparte, P. Z. S. London, 1851, p. 202, pl. 44.

"Largest among its allies; blackish, beneath pallid fuliginous: bill and feet red; cere and webs black. Length 16 inches; bill 2 inches long, 1 inch high, five-eighths wide at the base, three-eighths in the middle; wing 7½ inches; tail 3½; tarsi 1¼; longest toe 2 and 3-eighths inches.

Hab.—"North-west Coast of America.

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*Spec. No. 10698, there enumerated, seems to have called forth the remark above alluded to. This specimen, however, is believed to be the adult of *S. Suckleyi*, of which only the young bird was at that time recognized.

"This species is the largest of the subfamily, which is well known to contain the dwarfs of the water birds; it is one-third larger than *Ceratorrhina monocerata*, of which it has precisely the coloring, wanting only (at least in the state we have it) the little white feathers above the eye and at the corners of the mouth. The proportions of the wings, tail, feet and toes are the same; the bill and toes must have been reddish; the cere and membranes black. Like the *Ceratorrhina*, it seems to be confined to the north-western Arctic region of America; and we are led to believe it does not extend to the Siberian shores, from the circumstance of its not having been noticed by Russian naturalists."

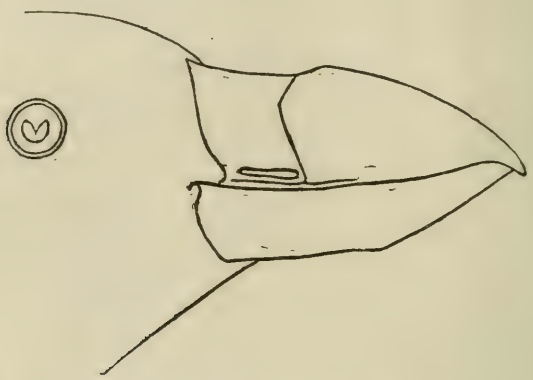

Fig. 3.—*Sagmatorrhina Lathami*, By. Nat. size.

The preceding is Bonaparte's notice of the species, containing all that is known about it by American ornithologists. The writer takes pleasure in acknowledging his indebtedness to Dr. P. L. Sclater, of London, for the accompanying figure, drawn from the type specimen in the British Museum. Dr. Sclater says very positively that the bird is a perfectly valid genus and species, and the figure evidently warrants the assertion. Independently of the difference between the cere and the horn, the shape of the bills of *C. monocerata* and *S. Lathami* are quite diverse. The dimensions of the latter are much larger than those of the former.

Sagmatorrhina Suckleyi, (*Cass.*) *Coues.*

Cerorhina Suckleyi, Cassin, Baird's B. N. A. 1858, p. 906. Based on spec. No. 4579, Mus. Smiths. Young. Puget Sound. Cooper and Suckley, Pacific R. R. Rep. xii, pt. ii, 1860, p. 284. Refers to same specimen.

American and Asiatic Coasts of the Pacific. Spec. in Mus. Smiths Inst — Young, (type of the species, Puget Sound;) adult, breeding plumage (San Diego, Cal.) Adult, (Hakodadi, Japan.)

Adult! breeding plumage! (No. 31908,* Mus. Smiths, ♀, San Diego, Cal. Feb. 3, 1862, J. G. Cooper.) "Iris white; bill black and orange; feet pale yellow, black below," (label.) Bill now obscure yellow, the culmen and basal membrane blackish. Feet dull whitish; tarsi behind and feet below blackish; claws black. Colors of the plumage almost precisely as in the adult *monocerata;* white feathers on sides of head exactly the same. Breast rather deeper grayish-ash, the color extending a little further, and more abruptly defined against the white of the other under parts.

* Figured in Elliot's Birds of North America.

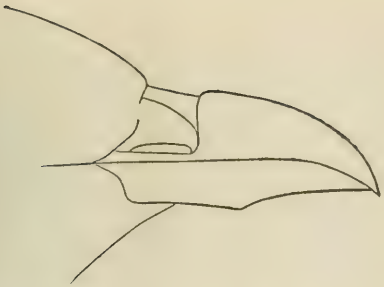

Fig. 4.—*S. Suckleyi*, Adult. Nat. size.

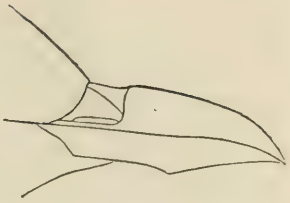

Fig. 5.—*S. Suckleyi*, Juv. Nat. size. Cassin's type specimen.

No vestige of a horn at base of upper mandible; this being covered with a soft skin, overlapping the culmen, extending to the nostrils, which open beneath its lower border. That part of the bill occupied by the membrane is depressed below the level of the rest, both on the ridge and sides. The membrane is shrunken and shrivelled in its present state. There appears to have been a slight tumidity, in the fresh state, of this membrane, just on the ridge, which may have elevated it to the level of the rest of the culmen, and which could possibly even have been inadvertently called a "knob" by one who regarded it as the beginning of a horn. No trace of an intercalated piece between the mandibular rami, which have thin, sharp, smooth edges, and come together in a fine point at the symphysis. Bill much smaller, weaker, and particularly less deep at the base than that of *C. monocerata;* but not much shorter, nor comparatively even so much compressed as in the latter bird. Culmen regularly decurved from base to tip; the latter moderately overhanging; rictus at first nearly straight, then gently declinate; gonys nearly straight, slightly concave; outline of mandibular rami about straight.

Decidedly smaller than *monocerata;* the wing comparatively longer. Length about 14·00; "extent 25·50," (label); wing 7 25; tarsus 1·10; middle toe and claw 1·90, outer do. 1·80, inner do. 1·45; bill: chord of culmen 1·30, of which the membranous part is ·30; rictus 1·85; gonys .75; depth of bill at base ·60; its width at same point ·45.

Young. (No. 4579, Mus. Smiths. Fort Steilacoom, W. T. Jan. 8, 1856. Dr. G. Suckley. Mr. Cassin's type of the species, as described *l. c.*) "Membrane at base of upper mandible grayish dusky black; middle of both mandibles dingy orange, their tips dusky; iris pale hazel; under surface of the webs of the feet, and the posterior aspect of the tarsi dusky black; upper surface of the toes bluish white, darker about the articulations; nails black." (Suckley, l. c.) The colors of the plumage are precisely as described for the young *C. monocerata;* possibly a shade darker, with rather more white on the under parts than in the corresponding age of the other species.

Much smaller than the adult; length "about 12.50; extent 24.00;" (Suckley, l. c.): wing 6·50; tail 2·00; tarsi 1·00; bill along culmen 1·20, of which the membranous portion is ·30; along rictus 1·60; along gonys ·60; its depth at base ·40. The bill is small and slender; its general shape calls to mind the bill of a young gull of one of the smaller species. The several outlines, particularly that of the culmen, are straighter than in the adult; the tip is less decurved. The bill is much longer, relatively and absolutely, than that of the corresponding age of *monocerata;* it is comparatively more slender. There is no trace of a knob;* the membrane has precisely the same characteristics as

* Dr. Suckley (l. c.), speaking of this specimen, uses the word "knob" in connection with it. His expression is to be taken as indicating merely the turgidity of the soft membrane during the life of the bird; which raises the membrane to or above the level of the rest of the culmen. The membrane, being very soft, shrinks and shrivels in drying, and the prominence disappears.

that of the adult bird above described. There is no trace of an accessory piece between the rami.

The bird above described was first indicated as a distinct species by Mr. Cassin in 1858; that gentleman founding his specific characters mainly upon the small size, somewhat darker colors, and much smaller, slender bill, as compared with *monocerata*. The species has always been looked upon with considerable mistrust, and very generally regarded as only a young *monocerata*. At the time of the introduction of *Suckleyi*, *C. monocerata* was not known in all its ages and stages of plumage, as it is at present. The horn which characterizes it was believed to be frequently wanting, particularly in the young bird. The accessory symphyseal piece had not received attention. These facts, together with the almost perfect identity in plumage of the two birds, very naturally led to the suspicion above mentioned; seemingly borne out, too, by the fact that the type of *Suckleyi* was a very young bird, the adult of which was unknown, or at least unrecognized. But it has been shown in the preceding article that indications both of the horn and of the accessory interramal element appear in *monocerata* even before it is fully feathered, and that these two distinguishing features are preserved in all ages, at all seasons, with both sexes. The discovery of *Suckleyi* in perfectly adult breeding plumage settles the question of its identity with *monocerata*. Specimen No. 31,908, above described, has no trace of a horn or accessory symphyseal piece; and is smaller, and otherwise conspicuously different from *monocerata*, though of almost precisely similar colors of plumage.

There is something highly interesting, very singular, and, with our present information upon the subject, totally inexplicable, in the fact that the plumage of the two birds is so nearly identical as not to be satisfactorily distinguished in any particular; while the bills differ in such radical characteristics. The suspicion comes unbidden, that the whole truth in the matter of *C. monocerata*, and *S. Suckleyi*—and *S. Lathami*, too—remains to be developed; while it is certain, at the same time, that nothing but the truth appears upon these pages.

In the reference of this species to the genus *Sagmatorrhina*, the writer is guided simply by Bonaparte's diagnosis, and by the figure of the head of *S. Lathami*, kindly furnished by Dr. Sclater. The dimensions of *S. Lathami* and the form of the bird are sufficient to distinguish *S. Suckleyi* from it.

SIMORHYNCHUS, *Merrem.*

Alca, Pallas, Spic. Zool. v, 1769, in part; and of some authors.
Uria, Pallas, Zoog. R.-A. ii, 1811, in part.
Lunda, Pallas, Zoog. R.-A. ii, 1811, in part.
Simorhynchus, Merrem, ———, 1819. Type *Alca cristatella*, Pall. Fide G. R. Gray. (Where is this genus named?)
Phaleris, Temminck, Man. Orn. ii, 1820. Type *Alca psittacula*, Pallas. (Also includes *cristatella*.) And of most authors.
Mormon, Lichtenstein, 1823, in part. (*M. superciliosa* = *camtschatica*, Lep.)
Ombria, Eschscholtz, Zool. Atlas, 1831. Type *Alca psittacula*, Pallas.
Cyclorrhynchus, Kaup, 1829. Type *Alca psittacula*, Pall. Fide G. R. Gray.
Tylorhamphus, Brandt, Bull. Acad. Imper. St. Petersburg, ii, 1837. Type *Alca cristatella*, Pall.
Ciceronia, Reichenbach, 1853. Type *Phaleris microceros*, Brandt.

Of moderate and very small size; general form stout. Usually with a crest, or with elongated feathers about the head. Bill variable: sometimes simple, oftener irregular in form, with various elevations and depressions, often with nodules or other accessory elements; always stout, compressed, shorter than the head, the culmen very convex, the tip acute. Nostrils entirely unfeathered. Wings and tail of the ordinary shape and length. Feet small and short; tarsus compressed, entirely reticulate, shorter than the middle toe. Toes long, outer and middle about equal in length, the claw of the latter largest. Claw

of inner toe reaching base of middle one. Claws much arched, compressed, acute, the inner edge of the middle one scarcely dilated.

The genus as above defined is framed to include a number of species, all more or less closely allied, yet presenting differences from each other in form in almost each instance. The various species are all nearly identical in the structure of the wings, feet and tail; in the bill no two entirely agree. Each presents suæ speciei characters in the shape of the bill; but the very fact that this organ varies so much seems to indicate that the differences are no more than of specific consequence. A glance at the synonyms above adduced will show what forms have been made indicative of genera. *Psittacula* is perhaps the species which has been most generally separated from the others, in view of its oval upper, and falcate under, mandible. But if this bird is to be generically distinguished, so also must *cristatellus;* for the latter differs in still greater degree, in the presence of an anomalous accessory element in the bill. This one being taken out, what to do with *camtschaticus*, so very closely allied? It is almost identical with *cristatellus* in all points of structure, except in the details of the configuration of the bill, and in these points it stands intermediate between this species and some others. Then *microceros* and *pusillus* would have to stand by themselves. So also would *tetraculus* and *Cassini*. These two, particularly, differ more from all the rest, in their short, simple conic bills, than any of the rest do from each other. In fine, if *psittacula* be allowed generic rank, so also must *cristatellus*, and pari passu must no less than three more genera be recognized. It seems much the most philosophical to group all these forms together in a single genus, regarding the differences in the bills as specific.

In such an acceptation, the genus comprises eight species, which may be thus analysed:

Species—(8.)

I. *Phaleris* Temm. Upper mandible oval, under mandible falcate; rictus curved upwards. No crest.
  Blackish; white below from the breast; a white spot below the eye ..... 1. *psittaculus.*

II. *Simorhynchus*, Merrem. Upper mandible triangular, under mandible nearly straight; rictus horizontal, sinuate. A long recurved crest.
  Angle of the mouth with a supernumerary corneous piece. Sides of under mandible unfeathered. One series of white feathers on the head ..... 2. *cristatellus.*
  Unknown. (See Pallas' description, infrà)..... 3. *dubius.*
  Angle of mouth without a supernumerary piece. Sides of under mandible feathered. Three series of white feathers on head... ..... 4. *camtschaticus.*

III. (*Unnamed subgenus.*) Bill very small, short, conic, simple, destitute of any irregularities whatever.
  Large; bill moderately compressed; a long recurved crest; fuliginous black above, fuliginous gray below. Wing 5·50; rictus ·70; width of bill at base ·30; tarsus, middle toe and claw together 2·50..... 5. *tetraculus.*
  Small; bill excessively compressed; no crest (?); uniform plumbeous, lighter below, whitish on the abdomen. Wing 4·25; rictus ·60; width of bill at base ·15! Tarsus, middle toe and claw together, 2·00..... 6. *Cassini, n. s.*

IV. (*Ciceronia*, Reich.) Smallest of the genus. Short white hair-like feathers over the forehead.

Length about 6·50; height of bill at base ·30. Upper mandible with a basal knob; bill stout and wide for its length. No decided white patch on scapulars .... 7. *microceros.*

Length about 5·50; height of bill at base ·20. Upper mandible without a knob; bill slender and narrow for its length. Conspicuous white patch on scapulars .... 8. *pusillus.*

The first distinctive name of this genus is said, by Mr. Gray, to be *Simorhynchus* of Merrem, with *cristatellus* as type. This genus is not in general employ. The present writer does not know where it is instituted, but adopts it upon the authority just mentioned. *Phaleris* of Temminck is usually adopted. This genus was framed, in 1820, to include both *psittaculus* and *cristatellus:* the characters as laid down apply best to the latter; the former is mentioned first. It cannot be used for *cristatellus*, however, being antedated by Merrem's name. If *psittaculus* is separated from the present genus, it must be called *Phaleris*, Temm., which antedates *Ombria* Esch., though the latter is usually applied to that bird. *Tylorhamphus* Brandt is simply a duplication of Merrem's genus; *Cyclorrhynchus* Kaup merely repeats Temminck's. *Ciceronia* Reichenbach is based upon the smallest species of the genus—section four in the preceding analysis. Section three of the foregoing synopsis, comprehending *tetraculus* and *Cassini*, is really the most distinct of any, and is the best entitled to generic rank. The chance to run in a name is left open to any one who may be ambitious in that line.

Simorhynchus psittaculus, (*Pall.*) *Schl.*

Alca psittacula, Pallas, Spic. Zool. v, 1769, p. 13, pl. 2, and pl. 5, figs. 4, 5, 6. Gmelin, S. N. i, pt ii, 1788, p. 553. (Based on Pallas and Pennant.) Latham, Ind. Orn. ii, 1790, p. 794. (Same basis.) Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 822. Quotes Steller, Nov. Act. Petrop. iv, p. 426, pl. 13, figs. 25, 26; and other authorities.

Lunda psittacula, Pallas, Zoog. R.-A. ii, 1811, p. 366, pl. 84.

Phaleris psittacula, Temminck, Man. Orn. i, 1820, p. 112. Stephens, Shaw's Gen. Zool. xiii, 1825, p. 44. Bonaparte, Synopsis, 1828, p. 426. Gray, Genera Birds, iii, 1849, p. 638. Bonaparte, Comptes Rendus, 1856, xlii, p. 774.

Ombria psittacula, Eschscholtz, Zool. Atlas, 1831, iv, p. 3, pl. 17, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 348. Cassin, Baird's B. N. A. 1858, p. 910. Elliot, B. N. Am. 1866, part i.

Simorhynchus psittaculus, Schlegel, Urinatores Mus. Pays-Bas, 1867, livr. ix, p. 24.

Asiatic and American coasts of the North Pacific; Aleutian Islands; Kamtschatka, (Mus. Acad. Philada.); Russian America, (Mus. Smiths. Institution); Behring's Sea, (Schlegel, Mus. Pays-Bas.); Japan?

Fig. 6.—*Simorhynchus psittaculus* (Pall.) Nat. size.

Bill moderately large, much compressed, densely feathered for some distance at base of upper mandible and sides of lower. Upper mandible almost perfectly oval in its lateral aspect, its culmen gently curved, and its tomial edges more decidedly convex, the former descending, the latter rapidly ascending to meet at an obtuse angle. Lower mandible extremely slender, falciform in shape, strongly curved upwards, its tip very acute, its tomial edges concave, corresponding to the convex tomia of the upper mandible; the gonys much and regularly curved. Nasal fossæ long and wide, but rather shallow; the nares rather broadly linear, or narrowly oval, overhung by a slightly projecting scale. Frontal feathers embracing culmen

in a slightly reëntrant angle, thence descending about perpendicularly to the very edge of the upper mandible. Feathers on side of lower mandible not extending quite so far as those on side of upper. Interramal space fully feathered, but in consequence of the peculiar shape of the rami, there is a small pit or fossa between them, just at their junction, which is unfeathered. Wings and tail of the usual length and shape; the length of the latter contained about three and two-thirds times in the length of the former from the carpal joint to the end of the longest feather. Tarsus shorter than the middle toe without its claw.

Adult.—Without a crest. A series of elongated very slender filamentous white feathers from the eye backwards and downwards, white. Entire upper parts, with chin, throat, breast, and flanks, fuliginous or brownish-black, lighter or grayer below than above; other under parts pure white, pretty trenchantly defined against the darker color of the breast. Bill orange or coral red, becoming enamel yellow at the tip, and along the cutting edges. Legs and feet dull greenish, darker posteriorly, (in the dried state.)

The above is the state of plumage of apparently most mature birds; but is much more rarely met with than the succeeding: Upper parts as just described, but no whitish feathers below and behind eye. Entire under parts white, marbled on the throat, breast and sides with dusky or blackish; this color usually occupying chiefly or wholly the tips of the feathers, whose bases are white. The mottling is thickest on the breast, most sparse on the abdomen; but it varies in degree with almost every specimen. A state of plumage is described as that of the young, in which the white occupies nearly the whole under parts, and is scarcely mixed with dusky, even on the throat and breast. This stage is not represented in American Museums. The tendency of the mottling, as the bird grows older, seems to be to increase on the throat, breast, perhaps on the sides and flanks, and to disappear from the other under parts, leaving the latter pure white, in marked contrast. The under wing coverts are always dark ashy brown; the short tibial feathers the same.

Length about 9·00; wing 5·40 to 5·75; tail 1·50 to 1·60; tarsus (average) 1·00; middle toe 1·10. Bill: chord of culmen ·60, chord of gonys just about the same; depth opposite posterior end of nostrils ·45; width at same point ·30; rictus nearly or about 1·00.

This very curious species may be instantly recognized, in whatever state of plumage, by the remarkable configuration of the bill; the rictus being strongly curved upwards, the upper mandible oval, obtuse, the lower falciform, acute. It is one of the longest and best known of the North Pacific representatives of the family, and is apparently a very common bird, though specimens do not occur in collections so often as might be expected. It seems to be decidedly boreal in habitat, and is not recorded, on the American coast, so far south as the United States, though occurring at Sitka, R. A., and probably off the coast of British Colombia. It has no specific synonyms, though it has been referred to several different genera. It is one of Dr. Pallas' species. It is the type of M. Temminck's genus *Phaleris*.

Simorhynchus cristatellus, (*Pall.*) *Merrem.*

Alca cristatella, Pallas, Spic. Zool. v, 1769, p. 20, pl. 3, and pl. 5, figs. 7, 8, 9. Gmelin, S. N. i, pt. ii, 1788, p. 552, No. 7. Latham, Ind. Orn. ii, 1790, p. 794, No. 6. Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 821. Vieillot, Gal. Ois. ii, 1825, p. 242, pl. 297.

Uria cristatella, Pallas, Zoog. R.-A. ii, 1811, p. 370, pl. 86. Erroneously cites as synonymous *Alca camtschatica*, Lepechin.

Simorhynchus cristatellus, Merrem., Bonaparte, Tab. Comp. Pelag. Comptes Rendus, xlii, 1856, p. 774. Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 25. (Considers *U. dubia* and *tetracula* Pall., young of this species.)

Phaleris cristatellus, Stephens, Shaw's Gen. Zool. xiii, 1825, p. 47, pl. 5. Not

of Temminck, Pl. Color. 200, which is *Alca camtschatica* Lepechin. Bonaparte, Synopsis, 1828, p. 426.—Id. Compt. and Geog. List. 1838, p. 66. Vigors, Zool. Voy. Bloss., 1839, Orn. p. 33. Gray, Gen. B., iii. 1849, p. 638. *Phaleris* (*Simorhynchus*) *cristatella*, Cassin, Baird's B. N. A. 1858, p. 906. *Tylorhamphus cristatellus*, Brandt, Bull. Acad. St. Petersb. ii, 1867, p. 348. *Phaleris superciliata*, Audubon, Orn. Biog. pl. 402; oct. ed. pl. 437. Not *Mormon superciliosa* Licht., nor *Phaleris superciliosa* Bonap., which refer to *Alca camtschatica* Lepechin.

Asiatic and American coasts and islands of the North Pacific, to Behring's Straits; perhaps into the Arctic Ocean. Kamtschatka and Behring's Straits, (Mus. Acad. Phila.) Japan, and north-west coast of America, (Mus. Smiths. Inst.) Not known to occur on the American coast so far south as Washington Territory, U. S.

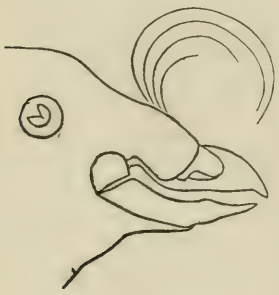

Fig. 7.—*Simorhynchus cristatellus*, (Pallas.) Nat. size.

Bill surpassing that of all other species of the genus in the extent and diversity of the irregularities of its surface and contour; these irregularities chiefly centered in the base and commissural edges, and produced by the addition of a supernumerary corneous element to the base of the upper mandible just at the angle of the rictus, as well as the expansion and projection upwards and outwards of the sides of the lower mandible towards and at its base. Bill, except in the length of its unfeathered commissure, rather short and wide, the length of culmen scarcely surpassing the width of bill at its base. Upper mandible with the culmen short and regularly very convex from base to tip, which latter is rather acute, and slightly overhangs the lower mandible; its tomial edge extremely sinuate and irregular, lightly notched just behind the tip, at the base widened and somewhat everted, for the reception of the cutting edge of the lower mandible; lower mandible not nearly so deep as the upper, somewhat ascending towards the tip, which latter is slender and acute; the gonys short, perfectly straight, moderately ascending, the sides of the lower mandible elongated, everted, their tomial edge elevated and dilated at the base, posteriorly corresponding in contour to the antero-inferior outline of the supernumerary piece. The latter is a subcircular or subquadrate corneous plate, slightly concavo-convex, wedged in between the bases of the tomial edges of the two mandibles, and forming the angle of the rictus; in color and texture it resembles the rest of the bill, of which it is a true component element. Nasal fossæ small and inconspicuous, not deeply furrowed, filled in by corneous substance like the rest of the upper mandible; the nostrils small, short, linear-oblong, placed close by the tomial edge of the mandible, overhung by an arched and much dilated corneous scale. Feathers extending on culmen to a point opposite the angle of the gonys, thence descending perpendicularly along the sides of the bill, just past but not touching the posterior extremity of the nostrils; thence following the sinuosities of the commissural edge of the upper mandible to the supernumerary piece, and around the border of the latter,* but not encroaching upon it. Interramal space of lower mandible densely feathered; but no feathers encroach upon the sides of the lower mandible, contrary to the usual rule in this group.

* This supernumerary corneous element is not attached by its whole surface to the subcumbent bone; but a part of its upper border is free and projects a little away from the skull. The fossa down behind this free raised border is fully feathered.

Wings and tail of the usual shape and structure of this group; the length of the latter contained three and a half times in the length of the former from the carpal joint to the end of the longest primary. Legs short, stout, little compressd. Tarsus entirely reticulate, shorter than middle toe without claw; outer toe as long as the middle one; its claw shorter and smaller than that of the middle one. Inner lateral toe extremely short, the tip of its claw falling far short of the base of the middle claw.

Adult.—An elongated crest of twelve to twenty slender feathers springing in a bundle from one point at the extreme forehead, far in advance of the angle of the rictus, and curving over forwards in the greater part of a circle. These feathers are not truly filamentous, having well developed, though short barbs, and appear narrower than they really are, from the slight obliquity of the barbs from the shaft. A slender bundle of filamentous feathers from the posterior canthus of the eye over the auriculars and sides of the neck. A very few shorter filamentous feathers forming a sparse interrupted superciliary series. All these filamentous feathers white or whitish; the crest concolor with the plumage of the upper parts. General color of the crown, nape, wing, tail, and whole upper parts glossy blackish, with a good deal of a fuliginous or brownish (not plumbeous or cinerous) tint; under parts a diluted shade of the same, or much more brownish gray, tending on the abdomen and posterior under parts generally to ashy gray. Under surfaces of wings and tail like abdomen. Bill and appendages orange or vermillion red, yellowish towards the tip. Feet dusky greenish, an undefinable color, in the dried state.

Length about 9·00; wing 5·25; tail 1·50; tarsus 9·00; middle toe and claw 1·35; outer toe and claw about the same, or slightly less; inner toe and claw 1·00; bill: chord of culmen ·45; tomia of upper mandible, excluding supernumerary piece ·70; greatest width of the latter ·25; tomia of under mandible ·90; gonys ·40; depth of bill opposite posterior end of nares ·45; width at same point ·35.

Young.—Similar to the adult, except in the following points:—The bill is smaller, weaker, less irregular and sinuous in outline, less brightly colored, wanting the expansion and eversion of the tomial edges of the two mandibles near their base, and with little or no trace of the supernumerary piece at the angle of the mouth. Even in the youngest specimens the bill shows unmistakable signs of its future character, and cannot be confounded with the simple conic bill of *tetraculus*, etc. The crest and white setaceous feathers are wanting, or only traces of them are apparent. The color is less blackish, more inclining to a fuliginous dusky above, and to a light dull brownish gray below.

This species never acquires a distinct parti-coloration like that of most species of the genus. With the exception of the whitish filamentous feathers on the head, the colors are uniform over the whole body, varying in shade on different parts; and the transition from the darkest, that of the upper parts, to the palest on the lower is effected by imperceptible degrees. The brilliantly colored bill is a conspicuous feature. The color of the feet cannot be accurately defined in the dried state; but the tints are probably not very striking. The crest only makes its appearance after the bird is full grown, is at least nearly a year old, and has acquired pretty much the perfect shape of the bill. The same is true of the white supra- and post-ocular filaments; and generally among the Phaleridine birds, the presence of these peculiar head-ornaments may be relied on as indices that the bird is adult, and that its bill has acquired its mature form. It is just possible, however, that these remarks may not apply to the setaceous *frontal* feathers of *S. microceros* and *pusillus*. The crest of *S. cristatellus* first appears as a little bundle of short straight feathers shooting out backwards from the plumage of the forehead. These plumes, in an early state of their growth, are much broader,

that is, with more distinct barbs or fibrillæ, than subsequently; considerable time elapses before they begin to curl over forwards, and they may continue straight until they are an inch or rather more in length. When full grown, they are nigh unto two inches long, curve until they almost make a circle, drooping gracefully, helmet-wise, upon the bill itself. The crest of this and other species is doubtless moved by peculiar muscles, and entirely subject to the control of its wearer, like the very similar crests of the birds of the genus *Lophortyx*.

Simorhynchus camtschaticus is obviously the species most likely to be confounded with the present. In fact, such has been its fate at its hands of so distinguished an ornithologist as M. Temminck. It would be wasting words to institute a comparison between the adults of the two species at this late day. In the youthful condition, before the distinctive head-ornaments are apparent, and even before the bill has attained its perfect form, so characteristic in each case, the two species may be distinguished with equal facility. In *camtschatica*, the basal moiety of the sides of the lower mandible is always feathered; in *cristatellus* this part of the bill is in its whole length always perfectly bare of feathers. This latter feature is, in fact, the most excellent diagnostic character of *cristatellus*; by the aid of which alone the species may always be recognized, be it in never so immature condition, with never so undeveloped a bill. The relationships of this species to *dubius* and *tetraculus* need not be noticed here, as they are given in all necessary detail under the head of these species respectively.

This species was introduced into the records in 1769, by Dr. Pallas, who fortunately gave it a binomial name, thereby securing it from appropriation by Gmelin, who contrived to filch so many species from Pennant, Latham, and other contemporaneous writers. Dr. Pallas first described it as an *Alca*, but afterwards removed it to the genus *Uria*—a very unwarrantable procedure. It is the type of Merrem's genus *Simorhynchus*, and of Brandt's genus *Tylorhamphus;* but not, as generally supposed, of Temminck's genus *Phaleris*, which is based upon *Alca psittacula* Pall. Though thus referred to so many different genera, it has hardly a specific synonym, unless the name on Audubon's plate 402 be regarded as such.

Numerous excellent specimens of this bird are in the collections of the Philadelphia Academy and of the Smithsonian Institution, from the various localities quoted at the head of this article. It is decidedly a boreal species, not recorded from the coast of the United States, though occurring on the Asiatic shores as far south, at least, as Japan.

Simorhynchus dubius, (*Pallas*) *Coues.*

Uria dubia, Pallas, Zoog. R.-A. ii, 1811, p. 371, pl. 87. "U. rostro fusco simplici, crista frontis pennacea recurva, * * sexu vel ætate tantum a præcedente [*cristatella*] videtur deferre, licet deficientes ad oris angulos calli carnei, et rostrum minus hiulcum differentiam insignem constituant. Cum præcedenti in mari extra Awatscham portum observatur. Irides candidæ. Rostrum sanguineo-fuscum. Pedes coerulescentes. Cæterum *A. cristatellæ* magnitudine et colore simillima."

Phaleris dubia, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 347. Gray, Gen. Birds, iii, 1849, p. 638.

Tylorhamphus dubius, Bonaparte, Tab. Comp. Pelag. Comptes Rendus, 1856, xlii, p. 774.

This species, if it be really such, appears appropriately named, since there is nothing to distinguish it from *cristatellus* beyond certain differences in the bill which might with propriety be attributed to an immature condition of the specimen upon which the species was based. And yet the mention of a recurved crest of feathers upon the forehead by Dr. Pallas militates against the supposition that his specimen was not adult. The great reliability which the scientific writings of Dr. Pallas claim, and justly deserve, from thei

uniform excellence and accuracy, necessitates no small degree of caution in a decision against the validity of one of his species. It will be evident upon the least reflection that, for example, such a perfectly valid species as *tetraculus*, might be so described, in a few sentences, that no striking impression of its difference from *cristatellus* should be conveyed. It is also to be borne in mind that Prof. Brandt, probably unsurpassed by any one in the accuracy and extent of his knowledge of the *Alcidæ*, and particularly well fitted to judge of Dr. Pallas' works, admits the species in question as distinct. And in the present instance it seems preferable to coincide with the views of these naturalists, and to allow the species to hereafter stand upon its own merits, until the proof that it has none is forthcoming, notwithstanding Dr. H. Schlegel's summary assignment of it (as well as of *tetraculus*) to *cristatellus*.

There is no specimen purporting to represent this species in any American Museum; and the only information regarding it which can be furnished at present writing is embodied in the above citation from the "Zoographia." It is hardly, if at all, noticed by other writers than those here cited. Mr. Cassin, however, queries it as a synonym of *cristatellus*.

SIMORHYNCHUS CAMTSCHATICUS, (*Lepech.*) *Schl.*

Alca kamtschatica, Lepechin, Nova Acta Petrop. xii, 1801, p 369, pl. 8.
Phaleris camtschatica, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 347. Gray, Gen. Birds, iii, 1849, p. 638. Cassin, Baird's B. N. A. 1858, p. 908.
Tylorhamphus camtschaticus, Bonaparte, Tab. Comp. Pelag. Comptes Rendus, 1856, xlii, p. 774.
Simorhynchus camtschaticus, Schlegel, Urin. Mus. Pays-Bas, 1867. livr. ix, p. 25.
Uria mystacea, Pallas, Zoog. R.-A. ii, 1811, p. 372, pl. 89. Quotes *Alca camtschatica* Lepechin, having just previously cited it for *cristatella*.
Phaleris cristatella, Temminck, Pl. Color. No. 200. Not of authors.
Mormon superciliosum, Lichtenstein, Verzeich. 1823, p. 89.
Phaleris superciliosa, Bonaparte, Comp. and Geog. List, 1838, p. 66.

North Pacific Coasts. Unalaschka, (Pallas.) Kamtschatka, (Mus. Bost. Nat. Hist. Soc.) North-west coast of America, (Mus. Smiths. Inst.)

Fig. 8.—*Simorhynchus camtschaticus*, (Lep.) Nat. size.

Bill much smaller, simpler, and differently shaped from that of *S. cristatellus*, though not distantly resembling the juvenile undeveloped condition of the latter. Width at nostril very slightly less than depth at same point, about two-thirds of the length of culmen; bill regularly ⊱ shaped in lateral outline; culmen very convex, regularly arched from base to tip; gonys nearly straight, rapidly ascending; commissure slightly sinuate, a little curved upward at tip; apices of both mandibles acute, fairly meeting each other on the level of the commissure; tomia of upper mandible slightly nicked near the tip of the bill. Wings and tail of usual shape for this genus; the length of the latter contained about three and a half times in the length of the former from the carpal angle to end of first primary. Tarsus much shorter than middle toe and claw; middle toe a little shorter than outer toe; middle toe and claw just as long as outer toe and claw; inner toe and claw a little shorter than middle toe without its claw.

The form of the bill alone is characteristic; the other details of structure are shared by the rest of the *Simorhynchi*.

A very long recurved crest of exceedingly slender, delicate, filoplumaceous

feathers, six (to ten?) in number, springing from the anterior part of the forehead, about opposite the anterior edge of the orbits, brownish-black; a single series of slender filamentous feathers from each side of the base of the culmen, and thence to the superior border of the orbit; a second similar but shorter series from the edge of the commissure, and thence along the lower part of the side of the jaw; a third similar series from the posterior canthus of the eye, and thence adown the side of the neck; yellowish white. Body colors almost uniform; brownish black, sometimes with more of a grayish, sometimes with more of a fuliginous hue; the wings and tail most intense in color, frequently nearly black; the under parts, particularly the belly, lighter and more grayish brown, inclining to mouse color. Bill orange red, its apex salmon color, or more decidedly yellowish. Legs (in the dried specimen) posteriorly dark brown, anteriorly lighter, more reddish-brown; feet dull brown; claws reddish-brown.

Length of body (approximately) 8·00 inches; wing 5·60; tail 1·60; bill: chord of culmen ·45; depth at base ·28, width at base nearly the same; length of rictus ·95; tarsus 1·00; middle toe 1·25, its claw ·35; outer toe 1·30, its claw ·30; inner toe and claw 1·10; length of outstretched crest 1·40; length of longest whitish feathers over eye 1·00.

Os hyoides examined: The apohyals are slender cylindrical bones ·6 long, slightly knobbed at the end, devaricating at an angle of about 40°. The ceratohyals are absent in the specimen. The urohyal is a delicate style for ·10 of an inch, then suddenly expands into a broad, flat, very thin spatulous lamina, subrectangular in shape, or rather cordate, transversely concavo-convex. This lamina is as long as the rest of the urohyal, and its breadth is rather greater than the length of the stylous portion. The basi-hyal is ·15 of an inch long, slender and cylindrical; bearing upon its apex an exceedingly thin, expanded, somewhat cochleariform glosso-hyal. No opportunity has presented itself of examining the tongue bones of other species of the family.

The present is a long and well known species. First made known, at the beginning of the present century, by Lepechin, (see above) it was redescribed as *Uria mystacea*, in the Zoographia Rosso-Asiatica, by Dr. Pallas, whose expression "* * pennulis setaceis albis elongatis superciliaribus *mystaceisque*," leaves no room for doubt as to the species he had in view. It was redescribed in 1823 by Prof. Lichtenstein, under the name of *Mormon superciliosum*. Unfortunately, it furnished the subject of Planche Coloriée, No. 200, at the hands of M. Temminck, under the palpable pseudonym of *Phaleris cristatella;* which event might have been the occasion of confusion and uncertainty, were the bird a less strongly characterized species. As it is, there is no difficulty in detecting and correcting M. Temminck's error. *S. camtschatica* is so very distinct from *cristatella*, that no special comparisons of the two are required. It is only necessary to point to the configuration of the bill, and the presence of superciliary and maxillary filoplumes, for their ready discrimination. For the rest, the present is a much smaller species than *cristatellus;* and the plume is perhaps longer, certainly less recurved, usually composed of fewer feathers, which are rather more filamentous. The setaceous feathers are essentially arranged, as may be seen above, in three distinct sets or bundles; one from the side of the bill along the commissure and lower part of the cheeks; one from the culmen over the eye, and a third from the posterior canthus of the eye backwards over the auricular region and side of the neck; though the first and last sets may appear more or less directly continuous with each other. It is possible that the plumage described above may not be the most perfect one; still, the perfect development of the crest and other ornaments warrants the belief that the bird from which it was taken is an adult. Authors speak of the under parts, particularly the abdomen, as being frequently nearly white; which may be the coloration of those parts in very mature or very old birds.

At present writing only one perfect specimen of this species is known to exist in any American Museum. The Boston Natural History Society possess this one; No. 9209 of the Museum Register, No. 8135 of the Fresnaye collection, now owned by the Society. The Smithsonian Institution has a mutilated specimen, (ah ead only), from the north-west coast of America, presented by Mr. John Gould. As far as can be judged, it belongs to a bird rather more perfectly plumaged than the Boston Society's specimen.

Simorhynchus tetraculus, (*Pall.*) *Coues.*

Alca tetracula, Pallas, Spic. Zool. v, 1769, p. 23, pl. 4, and pl. 5, figs. 10, 11, 12. Gmelin, S. N. i, pt. ii, 1788, p. 552, No. 8. Quotes Dusky Auk, Pennant, Arct. Zool. ii, p. 515, No. 435. Latham, Ind. Orn. ii, 1790, p. 794, No. 7. Quotes Pallas, Spic. Zool. Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 821.

Uria tetracula, Pallas, Zoog. R.-A. ii, 1811, p. 371, pl. 88.

Phaleris tetracula, Stephens, Shaw's Gen. Zool. xiii, 1825, p. 46. Brandt, Bull. Acad. St. Petersb, ii, 1837, p. 347. Gray, Genera Birds, iii, 1849, p. 638. Elliot, B. N. A. 1867, part iii.

Tylorhamphus tetraculus, Bonaparte, Tabl. Comp. Pelag. Comptes Rendus, 1856, xlii, p. 774. Erroneous assignment of Brandt's genus *Tylorhamphus*, which is based upon *cristatellus*.

Phaleris (*Tylorhamphus*) *tetracula*, Cassin, Baird's B. N. A. 1858, p. 907.

Asiatic (and American?) coasts of the North Pacific. "In mari orientali, præsertim Unalaschka," (Pallas.) Kamtschatka, (Mus. Acad., Philada., and Mus. Smiths. Inst.) Bay of Yedo, Japan, (Mus. Smiths. Inst.)

Fig. 9.—*Simorhynchus tetraculus* (Pall.) Nat. size.

Bill small, short, much compressed, regularly conical from a lateral view, simple, being without decided sulci, ridges, caruncles or other irregularities of surface of any sort; culmen narrow, regularly moderately convex from base to tip; commissure and gonys perfectly straight in their whole length; the tip of the bill turned neither up nor down, but the points of both mandibles almost meeting on the level of the commissure. Nasal fossæ scarcely discernible as such, the upper border of the small, basal, linear nostrils being flush with the rest of the bill. Frontal feathers extend forward with an obtusely rounded outline on the culmen, then rapidly recede backwards as they pass downward in a straight line just past the posterior end of the nostrils to the commissural edge of the upper mandible; those on the side of the lower mandible extending not quite so far, but the interramal space fully feathered Wings rather longer than usual in this group; legs, feet, and tail as in other species of the genus, the legs perhaps a little longer, comparatively, than in other species. A crest of ten or more slender elongated feathers with loosened fibrillæ springs from the middle of the forehead, just before the eyes, and curves forward in the greater part of a circle to near the tip of the bill. A very few filamentous feathers on the sides of the head, the slender series beginning at the posterior canthus, and thence extending downwards and backwards. A small white spot just below the eye. Everywhere dull blackish, or dusky; deepest on the back, becoming more of a smoky or brownish-gray

on the under parts; under wing coverts like the rest of the under parts; crest colored like the back. Bill an undefinable dusky* in the dried specimen; legs and feet livid gray, (probably greenish or bluish in life); membranes black; claws black.

Dimensions.—(Spec. in Mus. Acad., Phila.) Length about 8·50; wing 5·50; tail 1·60; chord of culmen ·35; gape ·60; gonys ·25; greatest height of bill ·33, greatest width ·25; tarsus 1·00; middle toe and claw 1·50, outer 1·40, inner 1·25.

Another specimen, (No. 22,258, Mus. Smiths. Inst.) Wing 5·60; tail 1·75; chord of culmen ·40; gape ·80; gonys ·40; height at base of bill ·40; width at same point ·30; legs and toes as in the preceding specimen.

Three specimens of this species examined: one in the Philadelphia Academy from Kamtschatka, which served as the subject of Mr. Cassin's description in the "Birds of North America;" another in the Smithsonian Institution, (No. 22,258,) received from the Bremen Museum, labelled "Phaleris cristatella, (Pall.); Winterkleid; Kamtschatka;" another also in the Smithsonian, (No. 15,805,) labelled "Phaleris cristatella; Bay of Yedo, Japan; Apr. 1854; eye gray; iris black; Rodgers' North Pacific Exploring Expedition." The last mentioned specimen is in a very poor state of preservation, and is a young bird, as evidenced by the short straight crest, directed backwards; though the bill is nearly perfect in size and shape, and the general aspect of the bird is precisely that of the adult. The other two specimens are in fine condition, and represent the perfectly mature state. These three include all that are known to exist in any American Museum. It is not a common bird in collections, and is frequently mistaken for the young *cristatellus*, to which species, however, it bears only a distant and superficial resemblance.

The bird here described is indubitably the "Dusky Auk" of Pennant, a species more perfectly and satisfactorily described and figured by Dr. Pallas as *Alca tetracula*. It is a strongly marked species, not distantly allied to, and somewhat resembling *cristatellus* in everything but the bill, which is of a radically different formation, as will be impressed upon the mind by a perusal and comparison of the descriptions given under head of these species. *Tetraculus* requires no special comparison with *cristatellus* or with *camtschaticus* for the substantiation of its distinctness. *S. Cassini* of this paper is the most closely allied species, and might just possibly be confounded by a careless or ignorant observer. The differences will be found under head of the latter.

The diagnostic points of this species lie chiefly in the small size and peculiar shape of the bill (cf. descr.); the length of the wings, proportionally greater than in any other species of the genus; and the greater length of the feet and toes. The wings, tail, feet and toes are about of the same absolute dimensions as those of *cristatellus*, although *tetraculus* is rather a smaller bird. The various shades of the dark color of the plumage are produced by admixture of black, brown and gray; there is no pure cinereous or plumbeous on any part of the plumage.

This is a species which entered at a very early day into ornithological literature, notwithstanding which it has not a single accredited synonym. Its claims to recognition as a valid species, distinct from *cristatellus*, have not been impugned, except by the learned Director of the Museum of the Pays-Bas. It has been the occasion of no confusion or conflict of opinion among writers, except in those few instances in which it has been erroneously supposed to have furnished the subject of Audubon's plate of *cristatellus*. The most cursory examination of the plate will convince the mind upon this point. Mr. Pennant, in virtue of his "Dusky Auk," which is this species, would have been entitled to the proprietorship of the bird, had he given it a binomial name; but as it is, Dr. Pallas stands as its lawful sponsor, having christened it *Alca tetracula* in 1769.

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* Pallas gives its color as "fusco-rubrum;" Gmelin, as "ex fusco-lutescens;" Latham, as "luteo-fuscum."

Simorhynchus Cassini, *Coues, n. sp.*

Phaleris Cassini, Coues, mss.

Diag.—S. rostro parvo, breve, valdè compresso, longitudine vix altitudinem excedente, latitudine dimidii altitudinis; ferè triangulare a spectu laterale; simplice, nec ullis additamentis corneis instructo; culmine leviter declinato-convexo, rictu recto, carinâ ferè rectâ, a scendente; suprà nigro-plumbeus, vertice, alis caudâque nigerrimis; subtus griseo-plumbeus, abdomine crissoque sensim albicantibus; longitudo tota corporis 7·75 (poll. Ang.); alæ 4·25; caudæ 1·40; tarsi ·80; digiti medii cum ungue 1·20; rostri ·40, alt. ·30, lat. ·15! rictûs ·60.

Typical and unique specimen, No. 46,564 of the Smithsonian Museum; a male (adult?) collected Aug. 3, 1866, at Ounimak Pass, Russian America, by W. H. Dall.

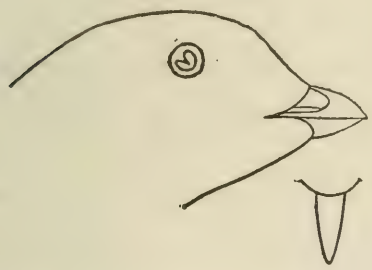

Fig. 10.—*Simorhynchus Cassini*, nov. sp. Nat. size.

Bill very small and short, only half as long as the tarsus; extremely compressed, being hardly more than half as wide as high at the base; its height at base three-fourths the length of culmen; lateral aspect of the bill nearly triangular; culmen regularly lightly convex in outline; rictus perfectly straight; gonys almost straight, ascending; tip of bill rather obtuse; no tubercles, sinuosities, or other irregularities of surface or of contour. Nasal fossæ well marked, oval in outline, reaching the culmen at its base, separated by a ridge from the commissural edge of the upper mandible; nostrils low down in the fossa, small, short, narrowly linear. Frontal feathers laid straight across the base of culmen, descending nearly perpendicularly along the posterior edge of the nasal fossæ, just attaining the posterior end of the nostrils, then retreating obliquely backwards and downwards. Feathers on side of lower mandible extending to a point opposite those on culmen; somewhat further into the interramal space, which is densely feathered. Wings and tail of usual size and shape. Feet small, tarsi moderately compressed, much shorter than the middle toe and without its claw; only two-thirds the middle toe and claw; outer toe as long as, or slightly longer than the middle, its claw much smaller than that of the middle; tip of inner claw just reaching base of middle claw.

Entire upper parts blackish-cinereous, or very dark lead color, deepest and very black on the crown, wings and tail. Entire under parts much lighter and more grayish plumbeous, insensibly blending with the color of the upper parts on the sides of the head, neck, and body, fading very gradually into whitish on the abdomen and under tail coverts. Inner webs of primaries, secondaries and tail feathers dusky gray; the outer glossy black; under surface of wings dusky gray, nearly black along the edge. Bill dusky, tinged with red; tarsi behind and toes below black; rest of feet an undefinable color in the dried state; perhaps reddish in life. "Eyes white and black," (collector's label).

This is a very strongly-marked species, differing to a remarkable degree from any other of the family. The chief peculiarity of form lies in the bill; so small, simple, extremely compressed, destitute of appendages, and otherwise unique, as will be seen by the description, and still more clearly by the diagram. As regards color, the tinge of clear plumbeous which pervades the uniform dark color is very characteristic. There is no trace of a crest, nor

of elongated filiform feathers about the head. Their absence, however, is not to be regarded as a specific character, since it cannot be positively affirmed that the specimen is fully adult.

The affinities of the species are clearly with *S. tetraculus*, which it resembles in the small simple compressed bill. But it is unnecessary to compare the two and point out the differences. A glance at the dimensions will alone suffice to show specific distinction. There is no other bird in the family that *S. Cassini* in the least resembles.

Simorhynchus microceros, (*Brandt,*) *Coues.*

? Alca pygmæa, Gmelin, S. N. i, pt. ii, 1788, p. 555, No. 12; and of the older authors. Based on the Pigmy Auk of Pennant. Not identifiable.

Simorhynchus pygmæus, Schlegel, Urinatores Mus. Pays-Bas, 1867, livr. ix, p. 23. Identifies *A. pygmæa* Gm. as *Phaleris microceros* Brandt or *P. nodirostra* Bonap., and *Uria pusilla* Pall. as young of the same.

Phaleris microceros, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 346.

Phaleris (Ciceronia) microceros, Cassin, B. N. A. 1858, p. 908.

Ciceronia microceros, Reichenbach.

Phaleris nodirostra, Bonaparte, Comp. and Geog. List, 1838, p. 66. Equals *microceros* Brandt. Audubon, Orn. Biog. v, 1839, p. 101, pl. 402. Audubon, B. Amer. vii, 1844, pl. 468. Gray, Genera Birds, iii, 1849, p. 644.

Ciceronia nodirostris, Bonaparte, Consp. Gav. Comptes Rend., 1856, xlii. p. 774.

"?*Phaleris corniculata*, Eschscholtz," (Gray.) Doubtful citation. Perhaps *Fratercula corniculata?* or *Cerorhina monocerata?*

Asiatic and American coasts of North Pacific; Kamtschatka; Kurile Islands; Plover Bay; Sitka; Japan. Numerous specimens in the Mus. Acad., Philadelphia, and Mus. Smiths. Inst., from various localities. Not known to occur as far south as Washington Territory, U. S., though found in the Japan Sea.

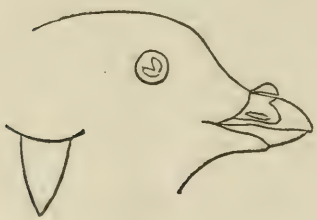

Fig. 11.—*Simorhynchus microceros*, (Brandt). Nat. size.

Smallest of the Auks with the exception of *S. pusillus*. Bill very short, not half as long as the head, stout, deep, wide, little compressed, obtuse at the tip; its width at base nearly equalling its heighth at the same point, and but little less than the length of culmen. A small but conspicuous globular tubercle arising from base of culmen, beyond which the culmen is strongly arched, very regularly convex, rapidly descending, its tip not very acute, obsoletely notched on the tomia, very slightly overhanging the tip of under mandible. Commissure almost straight its whole length, the extremity very slightly ascending. Gonys short, rapidly ascending, very slightly convex. Nostrils in a short but wide and deep fossa, placed rather higher up above the commissure than in some species; narrowly linear, not reached by the frontal feathers. Frontal feathers extending to the node on the culmen, then retreating obliquely backwards as they descend along the sides of the upper mandible; feathers on side of lower mandible extending farther than on upper mandible. Proportions of wings, tail, legs and feet as in other species of the genus.

Adult.—Forehead and lores conspicuously marked with delicate hair lines of white, produced by numerous short, stiff, but very slender white setaceous feathers scattered thickly thereover; a few of which filaments, more elongated and thread-like than the frontal ones, stretch adown the sides of the head

to below the level of the jaw; and a few more excessively delicate ones reach from the posterior canthus of the eye some distance along the sides of the occiput and nape. Entire upper parts, including the forehead, vertex, occiput, and sides of head, (with the exception of the white feathers just described) sides of neck, and wings and tail, glossy black. Inner webs of the primaries dusky gray. Under wing coverts, (except the smallest row just along the antibrachium and metacarpus,) white. Region about base of under mandible blackish plumbeous, and a few feathers along the sides under the wings and on the flanks blackish; all other under parts white, mottled, especially on the breast and sides, with black, the throat alone remaining immaculate. Bill red, tubercle and base of upper mandible dark bluish. Legs and feet an undefinable dusky in the dried state; the anterior border of the tarsus, and superior aspect of the toes dull greenish.

Length about 6·50; wing from carpus 3·75; tail 1·25; tarsus ·70; middle toe and claw 1·00; outer do. the same; inner do. ·85; bill: chord of culmen, (including width of knob) ·40; along rictus ·60; gonys ·25; height at base ·30; width at base slightly less.

The preceding is a description of the perfect plumage of this species, which is of comparatively unfrequent occurrence. The usual state of plumage of the bird as met with in collections is much as follows:—Bill as described above; filamentous feathers much as above described, but rather shorter and more sparse, and scarcely appearing behind the eye and along edge of side of lower jaw. Upper parts plumbeous black, sometimes slightly interrupted in its continuity by a few whitish feathers about the scapulars; the primaries grayish black, paler on their inner webs; secondaries grayish white at their tips. Under parts white, as before, but very sparsely marbled or waved with dusky; least so on the abdomen, most so on the sides and breast, where the blackish so increases in amount as to appear more or less continuous with that of the upper parts. Chin and sides of jaw as above described, but throat white, immaculate The dusky mottling varies greatly in amount and in intensity with different specimens. Sometimes it is reduced to a few isolated touches here and there, and again it is found to give the prevailing color to the under parts. That specimens in this mottled condition are not immature, is proven by the fact that the bill is fully grown and provided with a well developed tubercle; and that the forehead is thickly covered with white setaceous feathers. The mottling, however, is confined to the tips of the individual feathers, whose bases are pure white; and is thus *apparently* of a temporary and transient character, like that so frequently met with in young or winter specimens of gulls and petrels. It may be a seasonal feature, or one only found in birds of a certain age; and yet numerous facts tend to indicate it as a character of perfectly mature birds. Were one to examine a specimen with the usual moderate amount of mottling on the under parts, and notice the fact that the blackish occupies only the tips of the feathers, he could not fail to be impressed with the analogy just now hinted at, and to conclude that with advancing age the mottling would grow less and less, and finally disappear, leaving the under parts pure white, as in *pusillus*. Such, however, appears not to be the case. Specimens whose age is attested by a fully developed bill and well formed tubercle, are those most mottled below with blackish. And yet, no specimens have been found with the breast or any other part of the under parts uninterruptedly black, trenchantly divided from white areas. The peculiar kind of mottling exhibited by this species is so unusual as a condition of perfect maturity, that the suspicion arises that the very highest state of plumage is not yet known.

Young.—Entirely similar in plumage to the bird as just described; but the under parts white, scarcely relieved by mottling; and the white extending far around on the sides of the neck, leaving only a narrow median dorsal line black; the bill smaller than that of the adult, and the tubercle wholly want-

ing, or very imperfectly developed; its place on the culmen being occupied by a soft skinny covering like that on the nasal fossæ.

Specimens frequently occur in this condition. An understanding of its precise import is somewhat complicated by the fact that, although the tubercle is entirely wanting, and the bill otherwise obviously undeveloped, the head is well provided with the whitish setaceous feathers. Birds in such condition might be confounded, on casual inspection, with *S. pusillus*. But more careful examination will result in the observation, that the bill is far too large, *thick*, and heavy to be that of *pusillus;* that there is no conspicuous white patch on the scapulars; that the size of the whole bird exceeds that of *pusillus:* which points, in connection with some others which might be enumerated, will serve to distinguish the two species. Their relationships are dwelt upon more at length in the succeeding article.

When old birds of this species are moulting, in the fall, the glossy black of the fresh feathers on the back is interrupted with dull grayish black patches, formed by the old feathers which have not yet been renewed; and the old worn primaries and secondaries are dull grayish, fading almost into grayish white at their tips and along their edges. A specimen in such a condition, (No. 46,563, Smiths. Mus.) though palpably an old bird, has no trace of a caruncle on the bill.

It may not, perhaps, be exceeding due bounds, to hint at the possibility that the nodule on the bill may be temporary in character, assumed after a certain age, at a certain season, and then lost, wholly or in part, by absorption, to be again resumed at the same period of the following year, probably during the season of reproduction. This suggestion presents itself to the observer without straining on his part, and, in fact, is rather forced upon his attention, after examination of specimens, apparently adult, in which no trace of the tubercle is to be found. The tubercle is in essential characteristics an extrinsic formation upon the bill, differing radically in its structure from the rest of the organ. No good reason appears to forbid the supposition that its growth and subsequent re-absorption, may be periodical. Arguments for such a belief might readily be adduced in the periodical hypertrophy and atrophy of the combs, wattles, caruncles, and the various other fleshy or cutaneous or semi-corneous growths about the head and bill of very many birds, which enlarge during the breeding season, and afterwards diminish or entirely disappear. It is also within the limits of possibility that caruncles of this species is a sexual characteristic. The specimen above mentioned, (No. 46,563,) is marked female. However close to, or remote from, the truth either or both of the foregoing suggestions may be, it is certain that observed facts relating to the rostral knob of this bird are at variance with generally received doctrines about it, and are explicable by the application of one or the other of the preceding hypotheses. At present we are very much in the dark in the matter.

Various ages, conditions of plumage and bill, of this species are well represented by the numerous specimens in the Museum of the Philadelphia Academy and of the Smithsonian Institution, from various localities along the coasts and among the islands of the North Pacific. No specimens are contained in any other American collection.

The only questions of synonymy which arise in this case are connected with the identification of *Alca pygmæa*, Gm., and are treated of under head of *S. pusillus*. Prof. Brandt's name has priority over that of the Prince Bonaparte, although the latter has come into more general employ than the former.

Simorhynchus pusillus, (*Pallas*) *Coues.*

? *Alca pygmæa*, Gmelin. S. N. i, pt. ii, 1788, p. 555, No. 12; "rostro nigro, vertice, cervice, dorso, alis, caudâ pedibusque obscuris, jugulo et pectore glaucis, abdomine sordide albo. * * alce minor, 7 poll. longa," etc.—Based upon Pigmy Auk, Pennant, Arct. Zool. ii, p. 513, No. 431.

Habitat between Northern Asia and America. Latham, Ind. Orn. ii, 1790, p. 790, No. ii. Same as Gmelin's species. Bonnaterre, Ency. Method. Orn. 1790, p. 33. Same as Gmelin's species. Donndorff, Beytr. Zool. ii, pt. i, p. 825. Quotes Pennant and Latham.

? Phaleris pygmæa, Stephens, Shaws Gen. Zool. xiii, 1825, p. 48. Same as *Alca pygmæa*, Gm. Lath.

Phaleris pygmæa, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 347. Quotes both *Alca pygmæa* Gm. and *Uria pusilla* Pall., which he considers as synonymous. Gray, Genera Birds iii, 1849, p. 638. Quotes *Uria pusilla*, Pall.

Tylorhamphus pygmæus, Bonaparte Consp. Gav. Comptes Rendus, 1856, xlii. p. 774. Same as *pusilla*, Pall.

Uria pusilla, Pallas, Zoog. R.-A. ii, 1811, p. 373, pl. 70, haud dubiè. "Fronte brachiisque albo-notatis."

Phaleris pusilla, Cassin, Pr. A. N. S. Phila. 1862, p. 324. Elliot, B. N. Am. 1867, part vi.

Phaleris (*Ciceronia*) *pusilla*, Cassin, Baird's B. N. A. 1868, p. 909.

Asiatic and American coasts of the North Pacific. Kamtschatka, (Pallas.) Semiavine Straits (Mus. Smiths. Inst.) N. W. coast of America (Mus. Smiths. Inst.) Sitka, Russian Amer. (Mus. Pays-Bas, teste Schlegel.)

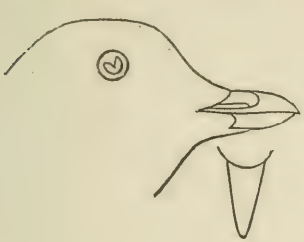

Fig. 12.—*Simorhynchus pusillus*, (Pallas.) Nat. size.

In *size* the least of its genus, and the smallest known natatorial bird. Length, (approximately correct) 5·50 inches; extent of wings ——, wing from carpus to end of first primary 3·50; tail 1·10; tarsus ·75, middle toe and claw 1·10; outer toe and claw 1·00; inner toe and claw ·85; bill along culmen ·40; along rictus, ·65; along gonys ·30; height at base ·20; width at same point the same or slightly less. (Compare these measurements, particularly of the bill, with those of *S. microceros*.)

With the usual *form* of the genus, except as to the bill, the shape of which is specific. Bill without tubercles, or other irregularities of contour; straight, comparatively slender, compressed; height at base much less than length along culmen; width at base the same, or rather less than, height at same point; the apex more acute than that of *microceros;* the outline of culmen at first straight, then slightly convexo-declinate; commissure almost straight, a little ascending anteriorly, still not sinuous in any part of its length; gonys lengthened, at first convex in outline, then rapidly ascending in a straight line. Nasal fossa large, extending along the basal moiety of the bill, reaching from the culmen nearly to the tomia; not deeply excavated; nostrils small, narrow, linear, one eighth of an inch long, basal, lying just above the commissural edge of the upper mandible. Frontal feathers running forward some distance in a rather narrow angle on the culmen, retreating very rapidly obliquely backwards and downwards on the sides of the upper mandible; extending on sides of the lower mandible a little further than on upper. (It is to be gathered from this description, more particularly, that the bill of *pusillus*, compared with that of *microceros*, is fully as long; but slenderer, more acute at the tip, less convex along culmen and gonys, more compressed in its whole extent, and non-tuberculate.)

Adult.—Entire under parts pure white; entire upper parts pure black, only relieved as follows: The humeral and scapular feathers are, all of them

or most of them, white or whitish in some portion or the whole of their extent; producing two patches of this color, not inaptly comparable to the similar patches on the scapulars of *Brachyrhamphus Wrangeli*, or *Collyrio borealis*, in size, shape and general appearance. About half the secondaries, the innermost ones, are quite conspicuously white on the tips of the outer web for a fourth or a third of an inch. The forehead and lores, from the base of the bill to the eyes and vertex, are lineated (exactly as in *microceros*) with sparse, distinct, very slender white setaceous feathers; none are apparent, among several specimens, behind the eye, or from the commissural angle of the bill. Pallas tersely summed up these points of coloration of the upper parts in saying "Fronte brachiisque albo-notatis;" and the white about the "arms" is a strong distinctive feature of the species in comparison with *microceros*. The white of the under parts reaches far around on the side of the neck; on the side of the head it only extends on a level with the commissure; it does not quite attain the base of the lower mandible, being cut off from the bill by a small blackish-lead-colored area. There are indication of a small whitish spot just above and below the eye, formed of feathers of the ordinary texture. The under wing coverts are wholly white, except just along the edge of the forearm. The short tibial feathers are dusky gray. Bill black, (as nearly as can be determined from the dried specimens,) the base, gonys and tip of lower mandible yellowish. Posterior aspect of tarsus, and inferior surface of toes and webs, blackish; rest of legs and feet a dull undefinable greenish-dusky (in the dried specimens.)

The changes of plumage of this species are not known; no other condition than the one above described is represented by the specimens in the Smithsonian Institution, and none are contained, as far as known, in any other American museum. No. 21,320 of the Smithsonian collection, obtained from Capt. John Rodgers' expedition to the North Pacific, collected at Semiavine Straits by Dr. Wm. Stimpson, is the one above described. No. 21,321, from the same locality, is a younger bird, but entirely similar to 21,320, except that it has a rather weaker bill, and only slight traces of the white setaceous feathers on the forehead. No. 46,562, collected Sept. 9th, 1866, at Plover Bay, by W. H. Dall, of the Western Union Company's Overland International Telegraph Expedition, a young bird, as shown by the soft feel of the feathers and other features needless to detail, is referrible, with some degree of doubt, to this species. The scapulars are very conspicuously white; the secondaries plainly tipped with white; the under parts pure white, unspotted as in typical *pusillus*. The black of the upper parts is tinted, especially about the head, with gray or plumbeous, and there are no traces of whitish setaceous feathers on the forehead; both of which features are to be attributed to the juvenility of the specimen. The doubt in the case centres in the bill. This organ has no trace of a tubercle, and is very small and weak, as usual in the young *pusillus;* but it *seems to be* deeper, and especially wider at the base, compared with its length, than is the case with typical *pusillus;* in these points of shape approximating to *microceros*. But "seems to be" is the most definite expression to be used in this case, for in the preparation of the specimen, or its subsequent drying or packing for transportation, the bill has been injured, and so much distorted, that its true form cannot now be determined with desirable precision.

It cannot be denied that the relations that this species bears to *microceros* are extremely intimate. So closely, in fact, does it approach the latter, that its specific validity might fairly be called in question by one of conservative views; especially in consideration of the well-known fact, not to be disputed, that the bills of all young *Alcidæ* are much smaller and weaker, and even in more striking points of form, conspicuously different from those of adult birds; and that a long time is required for their perfect development. This remark applies with especial force to the formation of the various knobs, ridges, sulci, rictal callosities, and the other irregularities of surface. The

mere presence or absence, therefore, of the node upon the base of the culmen, cannot be allowed to constitute a specific character in the present case, and may be left out of consideration, as may be, also, the color of the bill. Too much stress should not be laid upon the presence of white scapulars and of white tips to the secondaries, since in some specimens of undoubted *microceros* unmistakable traces of the former are to be found, and the ends of the inner secondaries are decidedly lighter than the body of the feathers. All the observable differences in the quantity and distribution of the whitish setaceous feathers upon the forehead and other parts of the head might readily enough depend upon a difference in the age of specimens. The pure uninterrupted white of the under parts of *pusillus* stands in apparently strong contradistinction to the black mottling of the same parts of *microcerus;* but it is to be remembered that the coloration in this respect of the latter species is very variable, ranging from a very sparse and scanty marbling to a nearly uniform black, particularly upon the breast, and is therefore not to be too implicitly relied upon, at least until it is more definitely ascertained than at present whether the black mottling tends to decrease or to increase with advancing age. If *microceros* grows more and more marbled with black as it grows older, we might with entire propriety presume upon the existence of a youthful state of plumage, in which the under parts are entirely white, like those of *pusillus.* Such is very likely the real state of the case; for the youngest examples of *microceros* examined—those which have no trace of a tubercle—are nearly white below, only very sparsely and indistinctly mottled with blackish. Still, aside from all these varying and therefore uncertain points, there appear good grounds for separating the two species, as will be observed on comparing the descriptions given in this and in the preceding article.

As the case stands with our present information upon the subject, *P. pusillus* is to be separated from *P. microceros:* first, by certain differences positively known to occur: *a*, in size, which is decidedly less, as evidenced by the measurement of all its dimensions; *b*, in form of bill, which is slenderer, more acute at the tip, not so deep at the base, particularly not so wide at the base, yet not shorter, than that of *microceros;* secondly, by certain differences very constantly observed, yet not proven to always hold good: *a*, absence of tubercle; *b*, conspicuously white scapulars and tips of secondaries; *c*, pure white under parts, uninterrupted by blackish mottling, and extending around on the sides of the neck; *d*, shortness and scantiness of the white setaceous feathers on the forehead; *e*, color of bill, mostly black, not mostly red.

It only remains to notice the synonymy of this species, and all that is to be said on this score relates to the identification of *Alca pygmæa* Gm. This name is founded upon the "Pigmy Auk" of Pennant,—a small species first described very loosely and imperfectly by the latter writer, whose account Gmelin merely renders into Latin, in applying a binomial name. There is no doubt that the bird was one of the little Auks of the North Pacific, as its very name, and the dimensions assigned (seven inches), clearly indicate, but there is no possibility, at the present day, of identifying it with precision. It was very possibly based either upon the present species or the preceding (*microceros*), and should these two ever be united, as young and old of the same, the name *pygmæa* might without undue violence be assigned to the species so constituted. So long as they are regarded as distinct, the name *pygmæus* must not be applied to either of them. As far as we can judge by the description, particularly the expression "jugulo et pectore glaucis," *pygmæa* may not impossibly have been based upon *Ptychoramphus aleuticus.* But Mr. Cassin's supposition is perhaps as near the truth as any that could be advanced: "It is possible that the Pigmy Auk of Pennant, which is *Alca pygmæa* Gmelin may be the young of this species [*microceros*], but it is more probable, judging from the descriptions of Gmelin and Latham, that several small species have been confounded under this name." The same gentleman

also calls attention to the fact, that some of the expressions in the diagnoses of the old authors have no basis in the characters of any Alcidine bird. Under the circumstances, it behooves us to ignore the name *pygmæa* altogether, since it cannot be identified; and to accept *pusillus* of Pallas, to which no possibility of doubt attaches, as the proper name of the present species.

PTYCHORHAMPHUS, *Brandt.*

Uria, Pallas, Zoog. R.-A. 1811, ii, p. 370, in part; not of authors.
Ptychorhamphus, Brandt, Bull. Acad. Sc. St. Petersb. ii, 1837, p. 347. Type *Uria aleutica*, Pall.
Mergulus, Gambel, Pr. A. N. S. ii, 1842, p. 266, in part; not of Ray, Vieill.
Arctica, Gray, Genera, iii, 1849, p. 638; in part; not of Mœhring.
Simorhynchus, Schlegel, Mus. Pays-Bas, 1867, livr. ix, p. 26, in part; not of Merrem.

Size moderate; general form stout; not crested, nor with any elongated feathers about the head. Bill about two-thirds as long as the head, three-fourths as long as the tarsus, very stout, straight, somewhat conical in shape, slightly if at all compressed, without nodes or irregularities, the tip acute; culmen very moderately declinato-convex in outline, the ridge broad, more or less corrugated transversely at the base; the sides of upper mandible bulging, the tomial edges inflected; sides of lower mandible nearly upright, flat, longitudinally grooved for the greater part of their length, their tomial edges somewhat inflected; rictus straight; gonys straight, or nearly so, very long. Nasal fossæ long and wide, shallow, filled in with soft skin; that of the two fossæ meeting over the base of the culmen, and there corrugated as just described; nostrils rather long, narrowly oval, subbasal, opening at the lower border of the fossæ, the edge of the membrane that overhangs them elevated, flaring. Frontal feathers in a nearly transverse line across the base of the culmen, thence descending a little obliquely backwards, just behind the nostrils, to the commissure; those on lower mandible extending, in the interramal space (which they completely fill), to a point rather beyond a perpendicular from those on culmen; then, encroaching very little on the sides of the lower mandible, they retreat in a straight line rapidly backwards and obliquely upwards. Wings moderately long, narrow, pointed, the primaries somewhat falcate, narrowing rapidly at the tip to an acute point, first longest, rest equably graduated. Tail short, broad, rounded, contained about three and a half times in the length of wing from the carpal joint; the feathers broadly rounded at their tips. Tarsus much shorter than the middle toe without its claw; about two-thirds as long as the middle toe and claw; greatly compressed, covered with small, very irregularly shaped polygonal reticulations; no large transverse scutellæ. Outer lateral toe as long as, or slightly shorter than the middle; its claw not reaching the tip of the middle claw. Tip of inner claw reaching base of middle one. Claws compressed, acute, moderately arched, the inner edge of the middle one dilated.

This genus was instituted in 1837 by Prof. Brandt, for the reception of the *Uria aleutica* of Pallas, its type and only species. It is strongly characterized by the bill, which is of a shape not even approximating towards that of any other Alcidine bird. Its points of structure in other respects are shared by the majority of the family.

PTYCHORHAMPHUS ALEUTICUS, (*Pall*) *Brandt.*

Uria aleutica, Pallas, Zoog. R.-A. ii, 1811, p. 370. "Corpore suprà fusco, subtus albo liturato, rostro producto, triplici plica inter nares."
Ptychorhamphus aleuticus, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 347. Bonaparte, Tabl. Comp. Pelag. Compt. Rend., 1856, xlii, p. 774. Cassin, Baird's B. N. A. 1858, p. 910. Heermann, Pac. R. R. Rep. x, 1859, Route to Cala. Birds, p. 75. Elliot, B. N. Am. part iv, 1867.
Phaleris aleutica, Gray, Genera Birds, iii, 1849, p. 638.

Simorhynchus aleuticus, Schlegel, Urinatores Mus. Pays-Bas, ix livr. 1867, p. 26.
Mergulus Cassinii, Gambel, Pr. A. N. S. Philada. ii, 1845, p. 266. Id., Journ. A. N. S. Phila. 2d series, ii, 1850, pl. vi.
Arctica Cassinii, Gray, Gen. Birds, iii, 1849, p. 638.

Pacific coast of North America, south to San Diego, California. Breeds on the Farralone Islands. Aleutian Islands (Pallas), Russian America, and whole west coast of the United States. (Mus. Smiths. Inst. and Acad. Philada.)

Adult.—Bill black, base of lower mandible whitish or yellowish. Legs anteriorly, and toes superiorly bluish; legs posteriorly, and toes inferiorly, with the membranes, blackish. A slight touch of white about the eyes. Entire upper parts blackish-plumbeous, the head, wings and tail nearly black. This color, gradually diluted until it is much more grayish-plumbeous, extends around the under parts and sides of the head, the throat, upper part of the breast, and whole sides of the body under the wings. Greater part of breast, with abdomen and under tail coverts pure white; the grayish plumbeous of the upper breast merging very gradually into the white of the belly. Under surface of wings dark lustrous gray.

Young.—Very similar to the adult; differing chiefly in being more decidedly blackish on the upper parts.

Moulting specimens have the upper parts much duller and grayer, the old wing and tail feathers faded, especially towards their tips, into light brownish-gray.

Length 8·00 to 9·50; extent 16·00 to 18·50; wing 4·75 to 5·25; tail 1·50 to 1 75; tarsus about 1·00; middle toe and claw 1·40; outer do. 1·30; inner do. 1·10; culmen ·75; rictus ·90; gonys ·60; depth of bill opposite posterior extremity of nostrils ·40; width ·30.

As regards color, this species is remarkably constant. Hardly any other differences than those first noticed are to be found, after examination of extensive series; and they may all be summed up as merely varying shades of the same color, and slight variation in its extent downwards upon the breast. The bill at all ages and seasons presents its peculiar parti-coloration. These remarks, however, probably do not apply to fledgelings. As regards size, the species is perhaps unusually variable, as may be seen by the measurements given above, which represent extremes in those cases where two sets of figures are given, and the average in other measurements. The bill, in particular, is liable to great variation both in length and in stoutness. Some bills are very large and robust, nearly as wide as high at the base, rather obtuse at the tip, and with decidedly curved culmen and gonys; others are longer in proportion to their transverse dimensions, decidedly compressed throughout, acutely pointed, with almost straight culmen and gonys. The corrugations about the base of the upper mandible are sometimes nearly obsolete, and when present are very variable in character. Very likely they are hardly, if at all, apparent in life; for they seem to be produced mainly by the shrinking in drying of the skin covering the nasal fossæ and base of the culmen. All the variations exhibited by the numerous specimens seem to be merely individual differences, and are not sufficient to excite a suspicion that more than one species is represented in the series.

Mergulus Cassinii Gambel (*Arctica Cassinii* Gray) is now well known to be this species, first described by Pallas, as above quoted. The species has no other synonyms of consequence. Its striking peculiarities suffice to prevent misconception regarding it.

Subfamily URINÆ.

MERGULUS, (*Ray*) *Vieill.*

Mergulus, Ray, Syn. Av. Vieillot, Analyse, 1816, and of authors. Type *Alca alle*, Linn.

Plautus, Klein, Prod. Av. p. 140. In part.
Arctica, Mœhring, Av Gen. 1752, p. 65. Type *Plautus columbarius*, Klein, Gray, Genera, iii, 1849, p. 644. Type *Alca alle*, Linn.
Alca, Linnæus, S. N., i, 1758. In part.
Uria, Pallas, Zoog. R. A. 1811, ii. In part.

Bill very short, culmen only three-fourths the tarsus, very stout, scarcely compressed, obtuse at the tip, as wide as high at the base, the sides of both mandibles convex or vaulted, the tomial edge of the upper greatly inflected, the culmen very convex in outline, with a broad flattened ridge, the rictus ample, much decurved towards the end, the gonys straight, very short, the inferior mandibular rami correspondingly elongated, widely divaricating, the interramal space very broad, the nasal fossæ short, wide, deep, partially feathered. Nostrils subbasal, short, more broadly oval, or more nearly circular than in any other genus except *Synthliborhamphus*. Wings rather longer than usual in this family, acutely pointed. Tail of ordinary length, much rounded, the feathers rather narrow and subacuminate at tip. Feet small and weak; tarsus scarcely compressed, anteriorly broadly scutellate, posteriorly finely reticulate. Toes of the usual proportionate lengths. Size very small; general form very compact, stout.

A peculiar genus of the *Alcidæ*, the most essential characters of which, as usual in this family, are found in the bill, though the other members offer some appreciable, if not salient features. The squat bunchy shape of the single species is very noticeable.

This is the genus through which a certain type of structure found among the Longipennes inosculates with the Pygopodes. The relationship of *Pelecanoides urinatrix* to *Mergulus alle* is one of strong analogy, if not of actual affinity, as has been elsewhere already pointed out by the writer.* Aside from the obviously Procellaridian characters of the bill, *Pelecanoides* (representing the subfamily *Halodrominæ*) is strictly a Pygopodous genus, and is very nearly identical with *Mergulus* in all the details of external structure, and has much the same general habitus. It is certainly the connecting link between the macropterous and brachypterous natatores, holding so strangely anomalous a position betwixt the two, that it cannot be with much propriety included under either. It seems entitled to the rank of a family, to take place between the *Procellariidæ* and *Alcidæ*.

Mergulus alle, (*Ray*) *Vieill.*

Mergulus melanoleucus, Ray, Syn. Av. p. 125. Stephens, Shaw's Gen. Zool. xiii, 1825, p. 345. Brandt, Bull. Acad. St.-Petersb. ii, 1837, p. 347. Brewer, oct. ed. Wilson's Orn., with notes by Jardine, 1840, p. 658, fig. 315. Fleming, Hist. Brit. Anim. 1842, p. 135. Thompson, Nat. Hist. Ireland, iii, 1851, p. 218.
Columba grœnlandica, " Albanus, Av. p. 81, pl. 85. Gunn., Act. Nidroff, i, p. 206, pl. 6."
Plautus columbarius, Klein, Prod. Av. p. 146, No. 1.
Alca alle, Linnæus, S. N. ed. x, i, 1758, p. 131, No. 6. Id. ibid. ed. xii, 1766, i, p. 211, No. 5. Brünnich, Orn. Bor. 1764, p. 26, No. 106. Hermann, Tab. Affin. Anim. p. 149. Müller, Zool. dan. Prodr. p. 17, No. 142. Latham, Ind. Orn. ii, 1790, p. 795, No. 10. Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 823, No. 5.—Donndorff's Var. B is *candida* Lath.—Wilson, Am. Orn. ix, pl. 74, fig. 5. Schlegel, Urinatores Mus. Pays-Bas, ix livr. 1867, p. 20.
Uria alle, Pallas, Zoog. R.-A. ii, 1811, p. 369. Temminck, Man. Orn. ii, 1820, p. 928. Bonaparte, Obs. Wils. 1826, No. 238. Audubon, Orn. Biog. v, 1838, p. 304, pl. 339.
Uria (Mergulus) alle, Bonaparte, Synopsis, 1828, p. 425.

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* *Cf.* Pr. A. N. S. Philada. May, 1866, pp. 172, 189.

Mergulus alle, Vieillot, Analyse, 1816, p. 66. Id., Gal. Ois. 1825, p. 236, pl. 295. Gould, Birds Eur. v, 1837, pl. 402. Macgillivray, Hist. Brit. Birds, ii, 1852, p. 341. Bonaparte, Comptes Rendus, 1856, xlii, p. 774. Cassin, Baird's B. N. A. 1858, p. 918. Boardman, Pr. Bost. Soc. N. H. Sept. 1862, p. 131. Verrill, Proc. Essex Inst. iii, 1863, p. 160. Samuels, Ornith. and Ool. of New England, 1867, p. 570.

Arctica alle, Gray, Gen. Birds, iii, 1849, p. 644.

Alca alce, Gmelin, S. N. i, pt. ii, 1788, p. 544, No. 5.

Alca candida, Brünnich, Orn. Bor. 1764, p. 26, No. 107. In pure white plumage; probably albino.

Mergulus arcticus, Brehm

European and American coasts of the North Atlantic. On the United States coast, in winter, south to New Jersey. Numerous specimens in Mus. Acad. Philada., Smiths. Inst., Bost. Soc. Nat. Hist., Essex Inst., Cab. G. N. Lawrence, author's Cab., etc.

Adult, summer plumage.—Head and neck all around, and entire upper parts glossy black, with a beautiful metallic lustre of a shade of blue, when in highest plumage; scapulars edged with white; shafts and inner webs of primaries brown, lighter at base; secondaries tipped with white; under surfaces of the wings brownish-gray; under parts from the breast pure white, with a few elongated feathers of the sides and flanks varied with black on the outer webs; bill black; legs and feet posteriorly blackish, anteriorly flesh-colored (dull yellowish in the dried state).

Adult in winter.—As before; the white of the under parts extending on the neck and throat to the bill, on the sides of the head to the level of the rictus, on the sides of the nape over the auriculars (where it is somewhat marbled with black), or even to the middle of the nape, more or less confluent with that of the other side

Young, first winter.—Recognizable by its smaller and weaker bill, by the duller and more brownish black of the upper parts, almost wanting in gloss, and by the greater extension of the white upon the sides of the hind head and neck. The scapulars and coverts are conspicuously marked with white, as in the adult. The feet are mostly dusky.

Length 8·50; wing 4·75; tail 1·50; tarsus ·80; middle toe and claw 1·20, outer do. 1·15, inner do. ·85; bill along culmen ·50, rictus 1·00, gonys ·20; its depth at base ·35, its width at same point about the same.

When in mature plumage, this is a very beautiful species. No other Alcidine has such lustre of the dorsal plumage, traces of which are even found in adult winter specimens. In the latter the extent of the black upon the throat is indicated by a dusky clouding of the bases of the feathers of the parts. The species is ordinarily subject to only moderate variation in size or colors. The condition of albinism has been described.

The first chronicles of this species are of great antiquity. It appears to have shared for a time with *Uria grylle* the soubriquet of "Columba grœnlandica." Since its description as *Alca alle* by Linnæus, it has been the basis of very few synonyms. *Alca candida* of Brünnich is this species in the albino state. *Mergulus melanoleucus*, Ray, is adopted by many authors. Mr. G. R. Gray adopts Mœhring's generic appellation.

SYNTHLIBORHAMPHUS, *Brandt.*

Alca, Gmelin, S. N. i, 1788, p. 554, and of the older authors, in part.

Uria, Pallas, Zoog. R.-A. ii, 1811, and of some authors, in part.

Fratercula, Stephens, Shaw's Gen. Zool. xiii, 1825, in part.

Synthliborhamphus, Brandt, Bull Acad. St. Petersb. ii, 1837. (Type *Alca antiqua*, Gm.) Subgenus of *Brachyrhamphus*, Brandt.

Mergulus, Vigors, Zool. Voy. Blossom, 1839, in part.

Arctica, Gray, Genera, iii, 1849, in part.
Anobapton, Bonaparte, Comptes Rendus, 1856, xlii. p. 774, in part.

Size moderate or rather small; general form stout, compact; head with or without a crest; bill somewhat as in *Brachyrhamphus*, but much stouter, and shorter for its depth; much compressed throughout, depth at base about half the length of culmen, culmen and gonys moderately curved, gonys straight, ascending; nasal fossæ small and shallow; nostrils subbasal, broadly oval or nearly circular, as in *Mergulus*, feathered; feathers extending to about the same distance on culmen and keel; on both mandibles retreating rapidly backwards from the point of their furthest extension; those on the upper passing just by the nostrils, but not covering the latter. Wings of usual size and shape in this group; secondaries very short, as in *Brachyrhamphus*, the tip of the longest not reaching much more than half-way from the carpal joint to the end of the first primary in the closed wing. Tail of usual length, short, broad, nearly square, or very slightly rounded, the feathers very broadly rounded at tip. Tarsi much compressed, anteriorly and laterally transversely scutellate, posteriorly reticulate; about as long as the middle toe without its claw. Outer toe as long as or rather longer than the middle; its claw smaller than that of the middle; tip of inner claw reaching base of middle. Claws small, short, compressed, moderately curved and acute, the inner edge of the middle one somewhat dilated.

With the general appearance of *Brachyrhamphus*, this genus differs from the latter in the bill and feet. The bill is deeper at the base, and more compressed throughout; the feet are still more different, having very broad transverse scutellation on the anterior face of the tarsus, instead of polygonal reticulation; and are larger, both relatively and absolutely, with longer, much more compressed tarsi than in *Brachyrhamphus*. The type of the genus is the old *Alca antiqua* Gm. A second species occurs, which differs from the type, as far as form is concerned, in a slenderer bill, and in the presence of a conspicuous crest.

Species.—(2.)

Not crested; bill stout, depth at base more than half the length of culmen; white on sides of vertex not extending in advance of the eyes..... *antiquus.*

Crested; bill slender, depth at base about equal to half the length of culmen; white on sides of vertex extending along sides of forehead nearly to the bill..... *wurmizusume.*

Synthliborhamphus antiquus, (*Gmel.*) *Brandt.*

Alca antiqua, Gmelin, S. N. i, pt. ii, 1788, p. 554, No. 11. Based upon Antient Auk, Pennant, Arct. Zool. 1785, ii, p. 512, No. 430. Latham, Ind. Orn. ii, 1790, p. 795, No. 9. Donndorff, Beytr. Zool. ii. pt. i, 1794, p. 824. Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 21.
Fratercula antiqua, Stephens, Shaw's Gen. Zool. xiii, 1825, p. 42.
Uria antiqua, Temminck and Schlegel, Fn. Japon. 1845, pl. 80. Audubon, Orn. Biogr. v, 1839, p. 100, pl. 402, fig. 12. Id. B. Amer. vii, 1844.
Brachyrhamphus (*Synthliborhamphus*) *antiquus*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 347. Cassin, Baird's B. N. A. 1858, p. 916.
Brachyrhamphus antiquus, Gray, Gen. Birds, iii, 1849, p. 644.
Anobapton (*Synthliborhamphus*) *antiquus*, Bonaparte, Consp. Gav. Comptes Rendus, 1856, xlii, p. 774.
Uria senicula, Pallas, Zoog. R.-A. ii, 1811, p. 369, pl. 85.
Mergulus cirrhocephalus, Vigors, Zool, Voy. Blossom, 1839, Birds, p. 32.
Arctica cirrhocephala, Gray, Gen. Birds, iii. 1849, p. 644.

American and Asiatic Coasts of the North Pacific. Kamtschatka, Japan Seas. Sitka, Russian America, (Mus. Smiths. Inst.) Mus. Acad. Philada.

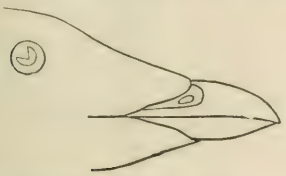

Fig. 13.—*Synthliborhamphus antiquus*, (Gmel.) Nat. size.

With the form, etc., typical of the genus, as above described.

Adult, high breeding plumage, (No. 46558, Mus. Smiths. Sitka, R. A.) Bill whitish, or yellowish, culmen and base of both mandibles abruptly black; legs and feet anteriorly apparently whitish, or yellowish; posteriorly, with both surfaces of the webs, black. Head all around, and throat, black; pure and intense above, on the sides below, chin and throat, tinged with fuliginous brown. A conspicuous stripe of pure white beginning over each eye, and extending backwards over the sides of the occiput, connected across the nape by some white feathers, and spreading on the sides and back of the neck, as a large disconnected series of trenchantly defined white streaks. Trace of white on each eyelid. Entire upper parts clear dark plumbeous, blackening on the upper tail coverts and tail. Upper surface of wings the same, or rather darker, the edge of the wing all along from the elbow, and the exposed parts of primaries, blackish; entire under surface of wings white, except just along the edges where it is mottled with dusky; the basal portion of the inner webs and shafts of primaries whitish; secondaries like the wing coverts, or rather darker, their bases whitish. Sides of the body under the wings pure velvety black, in marked contrast to the clear plumbeous of the upper parts and white of the lower. These black feathers are posteriorly greatly elongated, reaching quite to the tail, and overlying the sides of the rump and the flanks, which latter, however, are seen to be pure white on raising the elongated supercumbent feathers. This black along the sides extends anteriorly in front of the wings, and, still strongly contrasted with the plumbeous of the interscapulars, continues on as a band quite to the nape, which it crosses to become confluent with its fellow of the opposite side. On the sides of the neck it is thickly marked with the pure white streaks already described. The fuliginous black of the chin and throat is continuous with that of the sides of the head as far as the auriculars; further on it merely extends as a point along the middle of the throat, being separated from the black of the sides of the nape by a large white area, an extension to the auriculars of the white which is the color of the whole under parts except the sides under the wings, as already described.

Length 9·50 to 10·50; extent 16·75 to 18·25; wing 5·50; tail 1·60; bill along culmen ·60, along rictus 1·20, along gonys ·40, depth at base ·30, width ·20; tarsus 1·00; middle toe and claw 1·25, outer do. 1·15, inner do. 1·00.

Younger.—Bill and feet as above described. "Iris brown," (label). Upper parts as in the adult, but darker, the plumbeous being obscured by dusky, especially on the wing and tail coverts, and lower back. Forehead, crown, nape, and back of neck, sooty black, entirely unrelieved by white streaks, or with only traces of the latter on the sides of the occiput. Eyelids sometimes largely white. No black on the throat or chin; traces of it in a dusky mottling about the base of the bill. White of under parts extending on sides of head below and behind nearly to the eyes, and far around on the sides of the nape, so that only a median nuchal line is left blackish. Sides of body under the wings not pure black, but merely dusky plumbeous, and this not continuous on the feathers over the flanks, these being in some part white, producing a white and plumbeous variegation. The line of this dusky plumbeous hardly extends in front of the wings to the sides of the neck. Under parts white, as before, the bases of the inner webs of the primaries rather more white than in the adult.

The above described differences between the adult and young are very decided, and might suggest a distinction of species, were not various means between the extremes forthcoming. Beyond these variations in plumage the species is very constant in characters, with the exception of the bill. This differs a good deal as to its size and shape; but nevertheless usually preserves the specific characters which distinguish it from that of *Wurmizusume*. Thus the difference in length between the bills of two perfectly mature examples, absolutely identical in plumage, and in all other respects, save length of bill, amounts to a tenth of an inch along the culmen. This difference being unaccompanied by a corresponding difference in depth and width, gives a readily appreciable difference in shape of the bill.

The only species to which the present bears any special resemblance is *Wurmizusume*. The comparative characters of the latter are dwelt upon at length in the article immediately succeeding.

It is barely possible that two distinct species may be confounded in the synonymy adduced at the head of this article, and that the bird here described is not the veritable *Alca antiqua*, Gm., ("Antient auk" of Pennant.) In the description of these authors the upper parts are said to be dusky or sooty black, whereas, as will be seen by the description, the subject of the present article has these parts clear plumbeous. But we have just seen that the young of the present bird has the upper parts decidedly darker and duller than the adult; in fact tending, especially upon the wings and lower back, to dusky. The limits within which the species is known to vary in this respect are sufficiently wide to allow its reference to the bird of Pennant, Latham and Gmelin; especially when it is remembered that the particular descriptive terms used by these authors may not have been critically correct. It seems unnecessary, and it would be, perhaps, unjustifiable to attempt to discriminate the present species from *Alca antiqua*, upon the grounds just mentioned. They had best be regarded as the same, at least until suites of specimens may determine the existence of two species, differing in the particulars above mentioned. No indications of a distinction of species can be found in the extensive series of specimens at present contained in American collections.

This species, in the condition here described as that of the adult, is the *Uria senicula*, Pallas; and should bear the name of *Synthliborhamphus seniculus* in the event of its not proving the same as *Alca antiqua*, Gm. *Mergulus cirrhocephalus*, Vigors, (*Arctica cirrhocephala*, Gray,) is the same bird, in the same condition of maturity. The species has no other synonyms of consequence, except those resulting from its reference to several different genera.

In breeding plumage it is a very handsome bird, being in fact—with the exception of *Wurmizusume*—the handsomest of the *Urinæ*. It is of frequent occurrence along the coast and among the islands of the North Pacific; extending, on the Asiatic side, to Japan, and on the American, to Washington Territory, U. S. It apparently migrates southward in winter. It breeds in the vicinity of Sitka, R. A. It is well represented by numerous specimens in the collections of the Philadelphia Academy and of the Smithsonian Institution. It has been figured by Temminck and Schlegel, and by Audubon.

SYNTHLIBORHAMPHUS WURMIZUSUME, (*Temm.*) *Coues.*

Uria Wurmizusume, Temminck, Pl. Color, No. 579. Temminck and Schlegel, Fn. Japon, 1845, pl. 79.

Anobapton (*Synthliborhamphus*) *Wurmizusume*, Bonaparte, Tab. Comp. Pelag. Comptes Rendus, 1856, xlii, p. 774.

Brachyrhamphus (*Synthliborhamphus*) *Temminckii*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 347. Cassin, Baird's B. N. A. 1858, p. 916.

Brachyrhamphus Temminckii, Gray, Gen. Birds, iii, 1849, p. 644. Cooper and Suckley, Pac. Rr. Rep. xii. p. ii, 1860, p. 287. Elliot, B. N. Am. part vi, 1867.

Alca Temminckii, Schlegel, Urinat. Mus. Pays-Bas, livr. ix, 1867, p. 22. (Japan.)

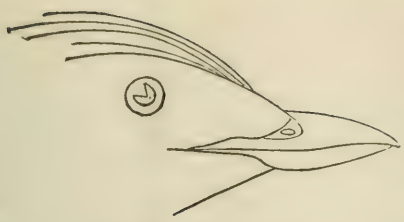

Fig. 14.—*Synthliborhamphus Wurmizusume*, (Temm.) Nat. size.

Asiatic and American Coasts of the North Pacific; south to Japan and Washington Territory, U. S. Specs. in Mus. Acad. Philadelphia, and Mus. Smiths. Inst.

Bill more slender and elongated than in the type of the genus, the depth at base less, and the compression not so great, the sides of the bill being less vertical; rictus nearly straight. Rather larger than *S. antiquus*.

Adult.—Bill decidedly yellow, (in the dried state,) the ridge of upper mandible alone black. Feet dull livid bluish, the webs dusky, (feet dusky yellowish in the dried state) "Eye brilliant gray, iris black" (label). A large conspicuous crest springing from the extreme forehead of a dozen, (more or fewer) slender elongated features, not recurved, but extending straight backwards quite to the occiput. A large conspicuous series of white feathers on each side of the top of the head, extending from the base of the crest, on the forehead far in advance of the eyes, to the side of the nape; there more or less confluent with each other, and then dispersed as isolated white streaks over the sides of the neck to the shoulders. In many specimens, however, apparently quite adult, these white stripes are hardly, if at all, apparent beyond the nape. Rest of head, including chin and upper part of throat sooty or fuscous blackish, sometimes with a cinereous tint; this color extending as far as the interscapular region, from which point the upper parts are more decidedly plumbeous, only the wings and tail being somewhat darker and more fuscous. Sides under the wings plumbeous black quite to the flanks; this color also extending forward in front of the wings and continuous with that of the sides of the neck and head. Under surface of wings pure white, except a little dusky clouding along the edge; bases of primaries, and the greater portion of their inner webs white, deepening very gradually through a continuously deepening shade of brownish gray, into dusky at the tips. Entire under parts (except the sides, as just described) pure white.

Length 10·50 to 11·00; extent 18·00 to 18·50; wing 5·50; tail 1·75; tarsus 1·00; middle toe and claw 1·25, outer 1·20, middle 1·00; bill along culmen ·70, rictus 1·10; gonys ·40; height at base ·25 to ·30, width about the same.

Younger.—Bill and feet as above; (bill sometimes, however, wholly blackish.) Without a crest; no white feathers about head, or only slight traces thereof. Face, including region just about the base of the bill, both above and below, crown and sides of the head to the level of the commissure, with nape and back of neck, plumbeous dusky; other upper parts, particularly the wings, the same, but most of the back with a more decided tint of plumbeous. Under wing coverts and primaries as in the adult. Sides under the wings narrowly fusco-plumbeous, the lengthened feathers over the flanks variegated with white. Entire under parts otherwise white; this color extending far around on the sides of the upper neck, nape and occiput.

Considerable variation in plumage as well as in size, and to a degree, in shape of bill, is exhibited by the numerous specimens examined. The differences in the bill are chiefly those of size, the relative proportions of the various measurements being pretty constantly preserved. The bill is always slenderer, and usually longer than that of *antiquus*, approaching in this respect the bills of the true *Brachyrhamphi*. The size of the whole bird varies somewhat, but not to any remarkable degree. In apparently equally adult specimens, the two series of white feathers, which form conspicuous stripes on the sides of the vertex and nape, vary much in length. Sometimes they spread

out on the sides of the hind-neck to almost as great an extent as is witnessed in the most highly plumaged specimens of *antiquus;* again they may stop abruptly on the occiput, or at least on the nape. The comparative amounts of dusky and plumbeous on the upper parts is various, as is also the intensity of either of these hues. Thus a specimen, (No. — Phila. Acad., from Japan,) has the upper parts including the wing coverts bluish ashy, or bluish plumbeous, light enough to form a marked contrast with the band of nearly black which crosses the nuchal region, and descends on either side under the wings. In this specimen, also, the bill is blackish, although it is evidently an adult bird, having a crest an inch long. There is sometimes much white on the eyelids, sometimes none. The outline of the white on the sides of the hind head and of the neck varies; the younger the bird, the more the white encroaches on these parts.

It is not ascertained positively that the crest which so strongly characterizes perfect specimens of this species as a constant feature, that is, obtained at a certain age, and ever afterwards worn. Very possibly, it is only assumed during the breeding season; and falls off afterwards, so that perfectly adult winter specimens may be without it. It is at all events not to be enumerated among the infallible diagnostic points of the species.

Compared with *S. antiquus*, the species is at once distinguished, when in adult breeding plumage, by the presence of a crest, and the different extent of the white stripes and streaks upon the head, nape and neck. (Consult descriptions above given.) These differences aside, it is a larger bird, on an average, though some specimens do not exceed in size some examples of *antiquus*. The bill is slenderer, though not necessarily longer, more acute at the tip, comparatively not so deep at the base, and rather less compressed, the culmen, rictus and gonys straighter. The identification of very young birds, however, is sometimes attended with difficulty; and some specimens in the present collections cannot, in fact, be satisfactorily determined. This state of affairs, however, is by no means unparalleled in other cases of perfectly distinct species; and by no means militates against the belief in the specified distinction of the two birds now under consideration. The adults cannot by any possibility be mistaken for each other.

This species is well represented in all its variety, by numerous specimens in the collections of the Philadelphia Academy and the Smithsonian Institution; though not contained, as far as heard from, in any other American cabinets. It is of frequent occurrence on the coasts of the North Pacific, and appears to be particularly abundant in the vicinity of Japan, whence most of the specimens described or recorded have been obtained. Its occurrence on the coast of the United States is open to question. Several specimens of *S. antiquus* (at least of the bird described in this paper under this name) are in our collections from Washington Territory, labelled "Brachyrhamphus Temminckii," and these appear to represent the species whose habits, etc., are alluded to by Drs. Cooper and Suckley, volume twelve, part ii, of the Pacific Railroad Reports, (Nat. Hist. Wash. Terr. p. 287, above cited) under the name of *Brachyrhamphus Temminckii.* But the description there given is that of the true *Temminckii*, having been copied from Mr. Cassin's article on the "Birds of North America."

The name which heads this article has priority over "Temminckii" of Prof. Brandt, and is therefore to be adopted, though its barbarous character is, assuredly, a matter of regret. It varies in orthography with different writers.

BRACHYRHAMPHUS, *Brandt.*

Colymbus, Gmelin, S. N. i, 1788; in part; not of authors.
Uria, Latham, Ind. Orn. ii, 1790; in part; not of authors.
Cepphus, Pallas, Zool. R. A. ii, 1811, in part.
Brachyrhamphus, Brandt, Bull. Acad. St. Petersburg, ii, 1837. Type *Colymbus marmoratus*, Gm.
Apobapton, Brandt, l. c. Same type.
Anobapton, Bonaparte, Comptes Rendus, xlii, 1856. Same type.

With the general habitus of *Uria* proper, but of much more delicate build, different pattern of coloration, and very small size. Bill small, slender, much shorter than the head, not longer than the tarsus, greatly compressed, acutely tipped; culmen gently curved, its ridge sharp, rictus nearly straight, gonys straight; tomial edge of upper mandible greatly inflected towards the base, notched near the tip. Nasal fossæ small and shallow, nearly filled with feathers, which mostly cover the extremely minute oval nostrils. Wings of ordinary length, very narrow, pointed, falcate, the secondaries extremely short. Tail of ordinary length, almost square, the feathers obtusely rounded. Feet very small, short, slender, and weak; tarsus scarcely compressed, variable in length, never longer than the middle toe without its claw (except in *brachypterus ?*) Outer and middle toes equal in length; the claw of the former much smaller than that of the latter; the inner very short, its claw not reaching the base of the middle claw. Claws small, weak, moderately curved, very acute.

The genus which comprises the Murrelets—to coin an English word, needed for the *Brachyrhamphi*,— is a very natural and strongly marked one. It comes nearest to *Uria* proper, from which, however, it is sufficiently distinguished, as will be seen by the above diagnosis. It contains four or five species, all inhabitants of the North Pacific, and more particularly of the west coast of North America. These may readily be diagnosticated as follows:—

Species:—(5.)

I. Tarsus much shorter than the middle toe without its claw.
  Upper parts blackish and chestnut, lower parts blackish and white ..... 1. *marmoratus.*
  Upper parts cinereous and white, lower parts pure white ..... 2. *Wrangelii.*

II. Tarsus just as long as the middle toe without its claw.
  Under surface of wings white ..... 3. *hypoleucus.*
  Under surface of wings dusky ..... 4. *Craveri.*

III. Tarsus longer than the middle toe without its claw, (teste Brandt) ..... 5. *brachypterus ?*

BRACHYRHAMPHUS MARMORATUS, (*Gm.*) *Brandt.*

Colymbus marmoratus, Gmelin, Syst. Nat. i, 1758, p. 583, No. 12. Based on the marbled guillemot, Pennant,* Arct. Zool. ii, p. 517, pl. 22, and Latham, Syn. vi, p. 336, pl. 96. Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 870.

Uria marmorata, Latham, Ind. Orn. ii, 1790, p. 799. Stephens, Shaw's Gen. Zool. xii, 1824, p. 249. Bonaparte, Synopsis, 1828, p. 423.

Brachyrhamphus (*Apobapton*) *marmoratus*, Brandt, Bull. Acad. St. Petersburg, ii, 1837, p. 346. Cassin, Birds N. A. 1858, p. 915; in part. Description of supposed adult is that of B. Wrangeli.

Brachyrhamphus marmoratus, Gray, Genera Birds, iii, 1849, p. 644. Cooper and Suckley, Nat Hist. Wash. Terr. 1860, p. 286, in part. Not the description of supposed adult, which is that of *B. Wrangeli.*

Anobapton (*Brachyrhamphus*) *marmoratus*, Bonaparte, Tabl. Comp. Pelagiens, Comptes Rendus, 1856, xlii, p. 774.

Cepphus perdix, Pallas, Zoog. R.-A. ii, 1811, p. 351, pl. 80.

Uria Townsendii, Audubon, Orn. Biogr. v, 1839, p. 251, pl. 430; octavo ed. vii, 1844, pl. 475. The figure of the supposed young is the adult; that of supposed adult may be really *B. Wrangelii.*

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* "With a black bill; crown dusky; throat, breast, and belly mottled with black and white; back and sides very glossy, and marbled with black and rust-color; wings dusky; greater coverts edged with white; tail black; legs yellow; webs black. Length 9 inches." Pennant, l. c. From Prince William Sound. Of this species, Vieillot, (Nouv. Dict. xiv, 1817, p. 36,) not exhibiting great sagacity, remarks, that it is "une jeune guillemot grylle, qui commence à prendre la livrée de l'adulte!"

? Uria brevirostris, Vigors,* Zool. Journ. iv, 1828, p. 357, and Zool. Beechey's Voy. Blossom, 1839, Ornith, p. 32. Evidently a young bird; may be of this species, or of *B. Wrangeli*.

? Brachyrhamphus Kittlitzii,† Brandt, Bull. Acad. Sc. St. Petersburg, ii. 1837, p. 346. Young bird; may be of this species, or of *Wrangeli*, or a distinct species.

Coasts and Islands of the North Pacific. On the American side, south in winter to California; breeds as far south as Vancouver's Island. Numerous specimens in Mus. Acad. Philada., Mus. Smiths. Inst, Cab. G. N. Lawrence.

Form typical of the genus as just described. Bill along culmen just the length of the tarsus, tarsus scarcely three-fourths the middle toe without its claw.

Adult, breeding plumage. (Description from No. 49655, Mus. Smiths. Inst., ♂, June 9, 1867, Vancouver's Island ‡ Bill black. Tarsi posteriorly and both surfaces of the webs blackish; legs anteriorly and toes superiorly livid flesh color, or dull bluish gray. Iris brown. Entire upper parts brownish black, everywhere transversely barred with chestnut brown, or bright rust color, except on the wings, which are uniform brownish black, the primaries darkest, their inner webs brownish grey towards the base. Under surface of wings smoky brownish black. A few whitish feathers variegated with chestnut and dusky on the scapulars. Entire under parts, including sides of head, neck and body, marbled with sooty brownish black and white. The feathers are white, with the tips of the dark color. The white rather predominates on the middle of the breast and belly, the dusky on the other parts; the latter color being nearly uniform across the throat, and on the long feathers of the sides and flanks.

Specimens vary a great deal in the precise amount of rusty brown on the upper parts, and of dusky mottling on the lower; but, so far as known, are never without this distinctive coloration in some degree; and it becomes heightened at the breeding season..

Length about 10·00; extent about 18·00; wing 5·00; tail 1·50; tarsus ·70; middle toe 1·00, its claw ·20; outer toe and claw 1·15, inner do. ·90; bill along culmen ·70, along rictus 1·35, along gonys ·55, heighth opposite base of nostrils ·25, width at same point ·20.

This species was originally described by Pennant as the Marbled Guillemot, whence *Colymbus marmoratus*, Gm. His description is that of the adult, in breeding plumage, but has been almost universally supposed to refer only to the young; and a very different species has been usually held to be the adult, as shown in the next article. It is also evidently the *Cepphus perdix* of Pallas.

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* "U. suprà griseo-fusca, capite, dorsoque albo notatis; subtus alba, fusco undulatim maculata, rectricibus albis, duabus mediis fusco-notatis, rostro brevi, gracili.—Alæ suprà et infrà, tectricesque inferiores fuscæ. Rostrum nigrum. Pedes flavi, membranis unguibusque brunneis. Longitudo corporis 9; rostri ad frontem ½, ad rictum 1⅛, alæ 5¼; caudæ 1; tarsi ½." Vigors, l. c. From San Blas.

† "Supra cinerea nigricante et pallide e fusco-flavescente undulata et submaculata. Subtus alba, subfuscescente tenuissime lavata, nigro et quidem in pectore frequentius undulata. Alæ e cinerascente et fusco nigræ. Rostrum brevissimum, capitis longitudinis tertiam partem circiter adæquans. Tarsi digito medio breviores. Longitudo a rostri apice ad caudæ apicem 9. Patria Kamtschatka."—Brandt, l. c.

‡ The following is an extract from a letter to Prof. Baird, from J. Hepburn, Esq., dated Victoria, Sept. 5, 1867, which accompanied a lot of specimens of which No. 49655 was one. It confirms the views maintained in the present paper, and gives some interesting facts: "You will find in the box a specimen of *B. marmoratus*. On comparing it with Mr. Cassin's description, (in Birds N. A.) I find it is what he calls the young bird. In this he is mistaken. In the first place, if such were the case we should see some red birds among the large numbers that are to be found here, whereas till this year I never saw but one specimen, * * In the next place, when I fell in with them last May, every bird was in the red plumage, including the one which, as I told you, would have laid an egg in two or three days; and lastly, proof conclusive, I have shot the young bird, two-thirds grown, in the winter plumage of the adult, except that the breast is more thickly barred than in any specimens I have seen in the winter, and at the very time the adults were in their red plumage."

Audubon's figure and description of the supposed young of this bird, under the name of *Uria Townsendii*, is really that of the adult. His figure of the supposed adult appears rather to represent *Wrangeli*.

It is difficult, perhaps impossible, to determine *Uria brevirostris* Vigors. This is evidently, as far as can be judged by the description, a young bird. It belongs to the short-legged group of the present genus; but whether it is the young of *marmoratus* or of *Wrangeli*, is a point which cannot be decided. The expression "capite dorsoque albo-notatis," and the absence of any mention of rust-color in the description, would lead one to assign it rather to *Wrangeli*.

Brachyrhamphus Kittlitzii, Brandt, is another bird which has not been identified since its original description. Like *U. brevirostris*, it is evidently a young bird, of the short-legged group; and the expression "fusco-flavescente undulata" induces the presumption that it is really only a young *marmoratus*. But it is possible that both it and *B. brevirostris* may be the young of the same species, or of two different species, which yet remain to be identified. It is not probable, however, that either of these names represent valid species, distinct from each one of those recognized in this paper.

Brachyrhamphus Wrangeli, *Brandt*.

Brachyrhamphus Wrangelii, Brandt, Bull. Acad. St. Petersburg, ii, 1837, p. 344. "Rostrum capitis dimidii circiter longitudine. Caput supra, nucha et dorsum e nigricante grisea. Alæ et cauda nigræ. Reliquæ partes, nec non stria longitudinalis supra alam, albæ. Tarsi digito medio breviores. Longitudine a rostro apice ad caudæ apicem 9½. Patria Insulæ Aleuticæ." Cassin, Birds N. A. 1858, p. 917. Copies Brandt's diagnosis.

Brachyrhamphus marmoratus, Cassin, B. N. A. 1858, p. 915, in part. Description of supposed adult *marmoratus* is that of *Wrangeli*.

Aleutian Islands, and north-west coast of America; south to Puget's Sound, and perhaps further. Numerous specimens in Mus. Smiths. Inst. (No. 11,457, perfectly adult, Puget's Sound, in February; No. 46,547, just fully fledged, Sitka; and others from same locality in various stages of adolescence; No. 46,542, Sitka, in January.)

Description (from No. 46,541, Mus. Smiths., perfectly adult male, Sitka, March, 1866).—With the size and proportions of the several members as in *marmoratus;* the bill absolutely shorter, relatively rather stouter. Bill scarcely as long as the tarsus. Tarsus much less than middle toe without claw.

Adult.—Entire upper parts, except the scapulars, very dark cinereous, the centres of the feathers, particularly on the back and rump, blackish, causing these parts to appear obsoletely waved with blackish and cinereous; the crown of the head, the wings and the tail, almost black, the larger wing coverts just appreciably white-margined; scapulars almost entirely pure white, forming two conspicuous broad longitudinal bands. Under wing coverts dusky brown; inner webs of the primaries the same, not fading, even at their extreme bases, into whitish. Entire under parts pure white, immaculate, except some dusky streaks on the long feathers of the sides and flanks. This white on the sides of the head invades the lores to the level of the top of the orbits, and extends into the nasal fossæ; then lowers a little, so that the eyes are left in the dark color of the top of the head; then on the nape extends almost to the median line, across which a few white feathers extend to the white on the other side, forming an imperfect nuchal collar; then extends in a straight line down the middle of the side of the neck. On the sides of the rump the white extends around so far, that the cinereous is only left as a band an inch wide. This white on the sides of the rump is as apparent upon the upper surface as that on the scapulars; it is directly continuous with that of the under parts, but on the flanks the long overlying cinereous feathers appear to separate it. Bill wholly black. Tarsi posteriorly and toes inferiorly blackish; rest of the feet,

including both surfaces of the webs, probably flesh-colored in life; dull yellowish-white in the dried skin.

Length "10·00, extent 18·00" (collector's label); wing from carpus 5·00; tail 1·50; tarsus ·70; middle toe without claw ·92, its claw ·20; outer toe and claw 1·10; inner do. ·88; bill along culmen ·60, along rictus 1·25, along gonys ·45, its height at base of nostrils ·22, its width at same point ·19.

Young. (No. 46,547, Mus. Smiths., Sitka, July, 1866; just fully fledged; the bill has still the white horny knob at tip of upper and under mandible, showing the juvenility of the specimen).—Bill very small, weak, short, imperfectly developed, about a third as long as the skull; ·45 along culmen; tarsus ·55; middle toe and claw 1·00; wing only 4·25. Entire upper parts blackish, much darker than in the adult, with only a just appreciable shade of cinereous; the scapular white present, but restricted in extent, and interrupted by imperfect bars of dusky across the feathers. Entire under parts white. Everywhere, except on chin, middle of abdomen, and under tail coverts, thickly marked with delicate waved lines of dusky, most numerous across the throat, largest on the sides and flanks, where some of the longer feathers are mostly dusky, finest on the lower breast. The whitish on the sides of the head does not extend so far, and merges insensibly into the dark color; on the nape a delicate line of white feathers almost forms a collar. The under wing coverts are as in the adult. Bill blackish. Legs and feet anteriorly more dusky than in the adult.

Another specimen (No. 46,542, Mus. Smiths.), taken in January, marked female, and evidently hatched the preceding summer, has the size of the adult, and the colors generally as in the young bird just described. But the upper parts are much lighter and more decidedly cinereous, as in the adult; the scapular white well developed; the dusky waving of the under parts confined to the sides and throat. The under wing coverts are dusky along the edge of the wing; but are elsewhere variegated with dull whitish; only to a small degree, however, not approaching the condition seen in *hypoleucus*.

In mature plumage this is a very handsome bird, and recognizable at a glance by the pure white of the under parts, and blackish cinereous of the upper, relieved by the conspicuous white of the scapulars and sides of the rump. It belongs to the short-legged division of the genus, being very different from *hypoleucus* and *Craveri* in the proportions of the tarsus and toes. It has the size and form of *marmoratus* in every respect except a just fairly recognizable difference in the shape of the bill. But it is quite a different species from *marmoratus;* so different, in fact, that no special comparison need be instituted.

The recognition, in the bird here described, of *Brachyrhamphus Wrangeli*, Brandt, is a matter of unusual interest, identifying, as it does, a species long ago described, but almost unknown to ornithologists at large, and throwing light upon what has always been a very obscure point in American ornithology. The writer is mainly indebted to Prof. Baird's suggestions for the fortunate direction of his investigatiou in this case. The present species has hitherto been regarded and described by American writers as the *adult* of the well-known *marmoratus*, whose curious colors, as described by all authors from Pennant downwards, and as figured by Audubon under the name of *Uria Townsendii*, have always been considered as indicative of immaturity. But numerous specimens, in adult *breeding* plumage, demonstrate the falsity of this view, as is satisfactorily set forth in the preceding article. Beyond the possibility of a doubt, the present species is not *marmoratus;* and it is certainly *Wrangeli* of Brandt.

Brachyrhamphus hypoleucus, *Xantus.*

Brachyrhamphus hypoleucus, Xantus, Proc. Acad. Phila. Nov., 1859. From Cape St. Lucas. Baird, eodem loco.

Coast of California. Specs. in Mus. Smiths., and Mus. Acad. Philada. So far south, in summer, as Cape St. Lucas, Lower Cal.

Description (from No. ———, Mus. Smiths., ♀, San Diego, Jan. 27, 1862; a typical example).—Bill along culmen half as long as the skull, three-fourths as long as the tarsus, as long as the middle toe and half its claw, very slender, much compressed, higher than wide at the base; culmen gently curved its whole length; rictus nearly straight; gonys perfectly straight; outline of the very slender mandibular rami a little concave. Tarsus just as long as the middle toe without its claw! Tip of inner lateral claw not reaching base of middle one. Wings and tail of usual shape; the latter contained about two and a third times in the length of the former from the carpus. Under tail coverts reaching (in this specimen) just beyond the end of the tail. Entire upper parts uniform cinereous, not varied by white. This color is slightly darker, and more blackish-plumbeous on the head. It extends on the sides of the head just to the eyes, the lids of which are of this color, a little further down on the auriculars; thence in a straight line along the middle of the side of the neck to the shoulders; thence in a straight line along the sides under the wings, where it is nearly an inch broad; the elongated feathers of the flanks are also mostly of this color. Other under parts entirely pure white. Under surface of wings entirely pure white! Primaries black on the outer web; the greater part of the shaft and inner webs white; the terminal portion of the shaft and inner webs brown. Tail feathers black, the inner webs somewhat brownish. Bill black, the base of the lower mandible whitish; feet anteriorly dull yellowish, posteriorly dusky, in the present dried state; "bill black, feet whitish-blue, black below" (label).

"Length 10·50; extent 17·50" (label); wing 4·80; tail 1·70; tarsus ·95; middle toe without claw ·95, its claw ·20; outer toe and claw 1·10; inner do. ·90; bill along culmen ·80, along rictus 1·30, along gonys ·45; depth at base ·22; width ·19.*

The specimen above described, collected at San Diego, Cal., by Dr. J. G. Cooper, is a little larger than the type, as will be seen by comparing the measurements with those in the accompanying foot-note. It is also described as representing the perfect plumage,—the type being imperfect in this respect. The upper parts are of a uniform very dark cinereous, without a shade of brown; the latter hue only occurring in specimens with worn and faded plumage. In the original description, here appended, the indications of the size of relative lengths of the tarsus and middle toe are made without reference to the claw; which fact explains an apparent discrepancy between the present description and the original one. The tarsus is exactly as long as the middle toe without its claw.

This is a very strongly marked species. The most striking diagnostic feature is the pure white of the under surface of the wings. In the uniformity of the cinereous color of the upper parts it is also unique. Nearly the same length of tarsus is found in *B. brachypterus*, Brandt, and *Craveri*, Salvadori; the tarsus is much shorter than the middle toe in *Wrangeli* Brandt, *marmoratus* Gm., "*Kittlitzii*" Brandt, and "*brevirostris*" Vigors.

This species is certainly not the *Uria brevirostris* Vigors, from San Blas. This is described as having "alæ suprà et *infrà*, tectricesque inferiores fuscæ, * * tarsi ½," which settles all questions on this score. It has the same dimensions, and the same relative length of tarsus and toes as *Craveri* Salva-

* The following is the original description of the type specimen: "Bill slender and slightly curved, about half the length of head. Tarsus scarcely shorter than the middle toe [and claw]. Above dark brownish-black, the edges of the feathers with a decided plumbeous tinge; the side of neck below, and the axillars with the concealed portion of the sides of the breast, ashy plumbeous. Entire under parts, including tail coverts and inside of the wings, pure white, this color extending on the sides of the head so as to include the eyes; the lids, however, are tinged with dusky; bill black; legs apparently reddish in life.

"Length 10 inches, extent 15·80, wing 4·70, tail 1·80, bill above ·70, gape 1·20, tarsus ·85, middle toe [with claw] 1·00. This specimen is considerably weather-beaten, and the old feathers of the upper parts are much worn, and bleached at the edges. The new ones are, however, as described."

dori, also from the coast of Lower California; but the latter appears to be a different species, as will be discussed further on. It comes nearest to *brachypterus*, from Unalaschka; in fact there is nothing in Brandt's brief diagnosis preventing the reference of the present species to *brachypterus*, except the expression "tarsi digito medio longiores." But in view of this discrepancy, and of the widely-separated localities whence the two species are described, it would be unsafe to take their identity for granted. It is much the best course to retain the present species as it stands, under the name *hopoleucus*, which has the merit of being positively identified, as is not the case, as yet, with *brachypterus*.

Several excellent examples of this species from various points along the coast of California are in the collections of the Smithsonian Institution and Philadelphia Academy. They present no individual differences worthy of special mention; except in the instance of the type specimen, which is brownish above, from the faded and worn condition of the plumage.

This species has probably the southernmost range of any of the family; occurring in summer at Cape St. Lucas. It was observed by the writer in December, 1865, off the coast of Mexico, about latitude 21° N.! Its extension northward remains to be ascertained. At present, it is not known to occur north of the coast of Lower California. Its southern habitat, as remarked by Prof. Baird, is a fact of great interest, when it is recollected how truly boreal are nearly all the species of the family.

Brachyrhamphus Craveri, (*Salvad.*) *Coues.*

Uria Craveri, Salvadori, Descrizione di altre Nuove specie di Uccelli esistenti nel museo di Torino, 1867, p. 17. Estratto dagli Atti della Società Italiana di Scienze Naturali, vol. viii, 1866.

"*Jun.*—Uria minima, crassitie *Merguli alle;* suprà fusco-nigra, dorso ac alis nonnihil griseo-tinctis. Subtus alba; rostro valde elongato, subulato, nigro; tarsis postice nigris, antice viride-luteis; unguibus nigris.

"Long. tot. 0,245; al. 0,125; caud. 0,018; rostri a rictu 0,037; tarsi 0,022; dig. med. cum ungue 0,024; (millimetres.)

"Parti superiori, lati della testa, le piume del mento lungo il margine inferioré della mandibula, lati del collo, del petto, e fianchi di color bruno-nero con una leggera tinta grigio-lavagna sul dorso, sul groppone e sulle ali; parti inferiori candide; becco nero; tarsi neri posteriormente, anteriormente giallo verdastri como auche le dita; unghie neré.

"Questa specie sarebbe commune lungo le coste del Golfo della California, e nell' Isola della Natividad posta nel Pacifico, a poca distanza dalla costa occidentale della Bassa California."—Salvadori, l. c.

This recently described species has much the same habitat as *B. hypoleucus*, and very much resembles the latter. The dimensions are the same in both, and the colors are very nearly alike. The expression "fusco-nigra, * * griseo-tinctis," exactly hits some specimens of *hypoleucus*,—those somewhat faded and worn in plumage,—though not applicable to more perfect specimens. In the above copied description, no mention is made of the under surfaces of the wings; but the needed information in this regard has been supplied through a private channel. Prof. Baird has received from Sig. Salvadori, and kindly transmitted to the writer, a life-size figure of the bird, accompanied by a note in which it is stated that "the lining of the wings is blackish, and some feathers are white-edged." This fact at once distinguishes the species from *hypoleucus*, providing the latter, in all stages of plumage, has the under surfaces of the wings white, as is most probable, judging by what is known of the variations in plumage of the birds of this genus.

Waiving the bare possibility of this bird s being a *young hypoleucus*, it cannot be referred to any described species, and must be regarded as a valid one. That it is not *brevirostris*, Vigors, is sufficiently evident from the dimensions; the tarsus of the latter being only half an inch long.

BRACHYRHAMPHUS BRACHYPTERUS, *Brandt.*

Brachyrhamphus brachypterus, Brandt, Bull. Acad. Imper. St. Petersb. ii. 1837, p. 346. Quotes "*Uria brachyptera* Kittlitzii, MSS." Gray, Genera, iii, 1849, p. 644. Cassin, Birds N. A. 1858, p. 917. Merely copies Brandt's description.
Anobapton (*Brachyrhamphus*) *brachypterus*, Bonaparte, Tab. Comp. Pelagiens, Comptes Rendus, xlii, 1856, p. 774.

"Suprà cinerea, alis caudaque nigricantibus. Collum subtus et in lateribus, pectus et abdomen alba. Rostrum capitis dimidii circiter longitudine. *Tarsi digito medio longiores.* Longitudine a rostri apice ad caudæ apicem 9. Patria Unalaschka."—*Brandt, l. c.*

This species is wholly unknown, at least on this side of the Atlantic, except by the above cited description of Brandt. It has nothing to distinguish it from some other *Brachyrhamphi* except the length of the tarsus. This, however, if it really obtains, is sufficient to distinguish the bird from all others, not only of the genus, but of the family; for no known alcidine bird has the tarsi longer than the middle toe.

URIA, (*Moehr.*) *Brisson.*

Columba sive *Columbus*, Auct. antiq. ex parte. *Vria*, Moehring, Av. Gen. 1752, p. 67, No. 73. Type *Columba groenlandica*, Willoughby.
Uria, Brisson; Brünnich, Orn. Bor. 1764; and of authors generally.
Alca, Linnæus, Syst. Nat. i, 1758; in part.
Colymbus, Linnæus, S. N. i, 1766, in part, and of many of the older authors.
Cepphus, Pallas, Spic. Zool. v. 1769, in part.
Grylle, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 346. Type *U. grylle*, Brünn.

Bill much shorter than the head, about equal to the tarsus, straight, rather stout, moderately compressed; culmen at first straight, then rapidly deflected; rictus straight, except just at tip; gonys ascending, straight, short, about half as long as the culmen. No groove in sides of upper mandible near its tip; commissural edge of upper mandible scarcely inflected. Nasal fossa wide, long, deeply excavated, partially bare of feathers, which do not wholly obtect the nostrils. Feathers extending on sides of lower mandible with a salient rounded outline. Wings and tail very short, the latter contained about two or two-thirds times in the length of the former from the carpal joint to the end of longest primary; tail slightly rounded. Tarsus much compressed, entirely covered with polygonal reticulations, somewhat scutelliform on the inner aspect; slightly shorter than the middle toe without its claw. Outer and middle toes equal in length; the claw of the former much smaller than that of the latter, tip of inner claw just reaching base of middle one. Claws compressed, moderately arched and acute; the outer one grooved along its outer aspect, the middle one greatly dilated along its inner edge. No postocular furrow in the plumage.

In the preceding diagnosis the characters of the genus are so drawn as to exclude the large species of *Lomvia*. Few writers have made this generic distinction, for which, notwithstanding, there is abundant reason, as may be seen upon a critical comparison of the two types of form; and as will be satisfactorily demonstrated at length under head of *Lomvia*. It need only be noted here, that the structure of the bill and feet are in many respects very different in the two genera.

The genus as here framed comprehends three distinct species, intimately allied to each other.

Species :—(3.)

Disregarding other and less prominent though very valid distinctions, the three species of Uria may be at once recognized by the following characteristics:—

A large white space on wing, entire. No white about head ..... 1. *grylle.*
A large white space on wing partially divided by a black line. No white about head ..... 2. *columba.*
No white on wing. Feathers around and behind eye and at base of bill, white ..... 3. *carbo.*

Or they may be still more briefly and quite as satisfactorily characterized thus:—*carbo*—upper and under surfaces of wings black; *grylle*—upper and under surfaces of wings white; *columba*—upper surfaces of wings white, under black.

The division of the white mirror on the upper surface of the wings of *columba* is not the most important point of coloration, though the most obvious, upon casual inspection, by which the species differs from *grylle*. A still stronger diagnostic character lies in the absence of white on the under surface of the wings.

Uria grylle, (*Linn.*) *Brünn.*

Columba groenlandica, "Linnæus, Syst. Nat. vi, ed. 1746, p. 23, No. 4. Albanus, Av. ii, p. 73, pl. 88. Ray, Syn. Av. p. 121, No. 6. Willoughby, Orn. p. 245, pl. 78. Martens, Spitzburg. p. 56, pl. 50, fig. B."
Columbus groenlandicus, "Klein Av. p. 168, No. 2."
Uria groenlandica, Brünnich, Orn. Bor. 1764, p. 28, No. 116, (blank.)
Uria nigra, striata, et minor, Brisson.
Alca grylle, Linnæus, Syst. Nat. i, 1758, p. 130. Schlegel, Urinatores Mus. Pays-Bas. livr. ix, 1867, p. 130, excl. synon. *Cephus columba*, Pall.
Colymbus grylle, Linnæus, Syst. Nat. i, 1766, p. 220. Hermann, Tabl. Affin. Anim. p. 148. Blumenbach, Handb. Naturg. p. 220. Müller, Zool. Dan. Prodr. p. 18. Gmelin, Syst. Nat. i, 1788, p. 584. Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 871. Several states of plumages enumerated as varieties.
Uria grylle, Brünnich, Orn. Bor. 1764, p. 28, No. 113. Latham, Ind. Orn. ii, 1790, p. 797, No. 2. Var. "B," is *columba*; perhaps also var. "E," the same. Temminck, Man. Orn. ii, 1820, p. 925. Vieillot, Gal. Ois. ii, 1825, p. 235, pl. 294. Bonaparte, Syn. B. N. A. 1828, p. 423. Audubon, Orn. Biog. iii, 1835, p. 148, pl. 219 and B. Amer. vii, 1844, p. 474. Peabody, Rep. Nat. Hist. Mus. 1840, Birds, p. 399. Gray, Genera Birds iii, 1849, p. 644. Thompson, Nat. Hist. Ireland, iii, 1851, p. 214. Macgillivray, Hist. Brit. Birds, 1852, ii, p. 331. Cassin, Birds N. A. 1858, p. 911, pl. 96, fig. 2; and Pr. A. N. S. Philada. 1862, p. 323. Herald Island. Bryant, Proc. Bost. Soc. Nat. Hist. May, 1861, p. 74. Coues, Pr. A. N. S. Philada. 1861, p. 225. Verrill, Proc. Bost. Soc. Nat. Hist. 1862, p. 131, and p. 142, and Proc. Essex Inst. iii, 1863, p. 160. Samuels, Ornith. and Ool. New Engl. 1867, p. 567.
Uria (*Grylle*) *grylle*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 346.
Uria (*Cephus*) *grylle*, Bonaparte, Comptes Rendus, 1856, xlii, p. 774.
Cephus grylle, Fleming, Hist. Brit. Anim. 1842, p. 134.
Cepphus lacteolus, Pallas, S. Z. v, 1769, p. 33. Albino, perhaps *columba*.
Colymbus lacteolus, Gmelin, Syst. Nat. i, 1788, p. 583. Albino. "C. niveus, rostro pedibusque ex carneo fuscescentibus." Donndorff, Beytr. Zool. ii, pt. i, 1790, p. 870.
Uria lacteola, Latham, Ind. Orn. ii, 1790, p. 798. Albino.
Uria grylloides, Brünnich, Orn. Bor. 1764, p. 28, No. 114. Changing plumage.
Uria balthica, Brünnich, Orn. Bor. 1764, p. 28, No. 115. Immature or winter.
Uria nivea, Bonnaterre, Ency. Method. Orn. 1790, p. 37. Albino, possibly of columba. Quotes Pall. Spec. Zool. v, p. 33.
Uria leucoptera,* Vieillot, Nouv. Dict. d'Hist. Nat. xiv. 1817, p. 35.

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* "Cet oiseau, dont je ne connais pas le pays natale, est totalement d'un noir profonde, avec une grande plaque blanche sur l'aile; sa taille est à peu près la même que celle du précédent," (*U. troile*)—*Vieill., l. c.*

Uria unicolor, Faber, Prodr. Isl. Orn. 1822, p. teste Schlegel. Greenland. without white on wings.
Uria (Lomvia) unicolor, Bonaparte, Comptes Rendus, 1856, xlii, p. 774.
Uria Mandtii. Lichenstein, Verz. 1823, p. 88, teste Schlegel. Spitzenbergen. Not of authors, which usually refers to *columba*.
Uria scapularis, Stephens, Shaw's Gen. Zool. xii, 1824, p. 250, pl. 64.
Cephus glacialis, *arcticus*, *Faroensis*, et *Meisneri*, Brehm.

European and American coasts and islands of the North Atlantic; very abundant. Arctic Ocean. Spitzbergen, Iceland, Greenland. On the American coast, in winter, south to New Jersey coast. Rare or accidental in the north Pacific, where replaced by *columba* and *carbo*.— ? Kamtschatka, (Mus. Pays-Bas, fide Schlegel.)* Herald Island, Arctic Ocean, (Cassin, Pr. A. N. S. Ph. 1862, p. 323); Spec. in Mus. Acad. Phila., Smiths. Inst., Bost. Soc. Nat. Hist.; Essex Inst.; Cab. G. N. Lawrence; author's Cab.

Fig. 13.—*Uria grylle*.—Nat size.

Adult, summer plumage.—Bill and claws black Mouth, legs and feet brilliant vermilion red, tinged with carmine. Entire plumage plumbeous or fuliginous black, with a tint of invisible green. Wings and tail pure black, the former with a large oval space on the upper coverts, all the under coverts and the subscapulars pure white.

This perfect breeding plumage is temporary, and lasts but a short time. Very many individuals do not assume it until June; and it is usually retained only during this and the succeeding month. Most specimens collected in May are found to still have some traces of the winter plumage, below described.

Adult, during autumnal change. The first indication of the moult is seen in the wings and tail, and is to be observed in nearly all specimens taken after July. By the latter part of this month, after incubation and nursing are finished, the wing and tail feathers become much worn, and faded, turning to a light brownish gray towards their tips. The white mirror shows scattered traces of dull brown. The body color loses its hue of green, and becomes more fuliginous brown. Isolated white feathers are scattered over the whole body; or the dark feathers acquire white tips. With the falling of the quill feathers, which may take place very rapidly, and deny for a season all power of flight, the bird is in the following condition, which is the pure *moulting* state, exactly intermediate between the summer and winter plumages:—No. 18254, Mus. Smiths., Labrador, Aug. 14, 1860. E. Coues. Wing feathers renewed, pure black, but not fully grown; wing from the carpus only 4·50 long. Mirror of renewed feathers, almost or quite pure white, but small; under wing coverts and axillars pure white. Head and neck all around, rump, and whole under parts marbled with black and white in equal quantity, the bird looking as if dusted over with flour. Back black, most of the feathers lightly bordered with white, the scapulars more largely white. A still further increase of white produces the following:—

Adult, winter plumage.—Wings and tail black, the mirror and under wing coverts faultlessly white. Head and neck all around, rump and entire under

* Although this author does not recognize the specific validity of *U. columba*, and would therefore range specimens of the latter under *grylle* in his catalogue, a specimen (No. 5.) there enumerated appears to be this species, as is inferrible from the expression "Au miroir d'un blanc pur."

parts pure white; the back, (and frequently the crown, and back of neck,) black, more or less variegated with white. Audubon figures this condition very nearly.

The change in spring—mostly occurring during April and May—is the reverse of that already described as the autumnal moult.

Fledgelings.—(Labrador, July, 1860, E. Coues, Mus. Smiths. No. —.) Length about 6·00; bill ·50; tarsus ·60; middle toe and claw ·90, etc. Wholly covered with soft wooly puffy down, fuliginous brownish black; bill and feet brownish black.

Young, first plumage.—Traces of the down on various parts of the body; the bird probably just beginning to fly; length about 10·00, wing 11·50; bill 1·00, black; tarsus 1·25; reddish dusky, as also are the toes. Upper parts plumbeous or sooty black, scarcely varied with white. Mirror beginning to appear, as white spotting on a blackish ground. Entire under parts white, thickly marbled, rayed and undulated with light touches of dusky.

This state tends to pass directly into a condition exceedingly similar to, if not identical with, that of the adults in winter. But birds of the first winter may, at least early in the season, be distinguished from old ones by a certain "feel" of the plumage, and a shorter, weaker bill, less developed as to its ridges and angles.

Accidental variations.—The foregoing descriptions apply to the various stages of plumage, which are strictly normal in character, and which, though unending in precise degree, and varying with almost every individual, merge insensibly into each other. The species is, however, also very subject to accidental and entirely abnormal variations. Of these, albinism is the most common. (Spec. in Mus. Acad. Philada.) Entirely milk white, without a trace of black; bill and feet light colored; eyes probably pink in life. The opposite condition of melanism is described by authors. This consists in the total absence of white on the wings; and is apparently of infrequent occurrence. Both these conditions have been described and named as characterizing distinct species. In the latter, the bird must not be confounded with *Uria carbo*, which is totally different.

Dimensions.—Adult: Length, (average) 13.00; extent, (average) 22·50; wing 5·50 to 6·25; tail 2·00, a little more or less; bill along culmen 1·30; along rictus 1·75; along gonys ·65; depth at base ·45, width ·35; tarsus 1·25; middle toe and claw 1·75, outer do. slightly less, inner do 1·40.

It may be of advantage to look closely into the formation of the white area upon the wing of this species, to the end that its composition may be clearly understood, and recognized as different from that which obtains in the allied species, *U. columba*. The mirror upon the upper coverts varies to a degree, and in a precisely similar way, in each species; but when perfect constantly presents a radical difference.

When *Uria grylle* is observed flying, as is its wont, low over the water with rapid beats of the wings, the eye receives the impression of a black bird, with a large white circular spot on the wing. This spot is constantly in view, and represents the retinal image resulting from the white spaces upon both the upper and under surface of the wings blended together by the rapid motion of the wings. Those who have observed *Uria grylle* in its native haunts will appreciate the pertinence of this remark. *Uria columba* presents no such peculiarity of appearance, there being no white upon the under surface of the wings; and the eye readily follows the movement of the small white space upon the wings, as with the changing attitudes of the bird, it is now apparent, now lost to view.

In *Uria grylle*, the row of great coverts upon the secondary quills are basally black, terminally white. The outermost are white for rather less than half their length, and the white occupies chiefly the exterior webs. Nearer the body they are white for more than half their length, and the white occupies both webs of the feathers.

The next row of coverts are wholly white in their entire length, except perhaps for a very brief space just at their base; and they are throughout long enough to cover entirely the dark portion of the first row, reaching a little beyond and overlying the commencement of the white upon the latter; so that the white is continuous and unbroken. One or two more rows of coverts have precisely the same character and continue the white space uninterrupted.

The shorter coverts, for about half inch from the edge of the antibrachium are black. The last of these, however, are broadly tipped with white, which white portion overlies the extreme bases of the next row, blending its color with that of the latter; the anterior edge of the mirror being thus the line of union of the black and white portions of these coverts, taken collectively.

In *Uria columba*, the row of great coverts is externally wholly black, or at most the outermost feathers have only a very narrow white tip. The amount of white on the feathers increases rapidly from without inwards, until on the innermost there is nearly or quite as much white as in *grylle*. In consequence of the small amount of white on these coverts, the next row of coverts do not overlie, nor even reach it; there being left a broad space of dusky between the white tips of the second row of coverts, and those of the first; which space rapidly diminishes from the edge of the wing towards the body, forming the curved crescent of dusky which is obvious upon the wing of this species.

The mirror of *Uria grylle* is subject to much variation, which, however, never obscures its distinctive characters in any decided degree. The greater coverts may be wholly dusky; then the mirror is the same as before, except in its smaller size; the next row may be tipped with dusky, so that no white comes forward to coalesce with that of the greater row, and an appearance like that of *columba* is produced; which need not deceive, since the dusky results from the second row of coverts instead of the first. All the wing coverts may be tipped with dusky; producing a variegated or spotted mirror. Finally, the mirror may be only indicated by a few isolated white feathers, or may be altogether wanting.

It is to be borne in mind, that the difference in the mirror of *U. grylle* and *columba* is only one of the most obvious, but not the most specific distinction. In the very possibly occurring cases in which there is absolutely no difference between specimens in this respect, the absence of the white under the wing, and the shape of the bill, readily distinguish *columba* from *grylle*.

Perhaps no bird has so many synonyms as *Uria grylle*. Independently of its reference to divers genera, a large number of nominal species have been instituted upon its various stages of plumage, some of them requiring brief notice. A very common name for the species among pre-Linnæan writers was "Columba groenlandica,"—obviously a mere rendering into Latin of a popular designation. The word "grylle" made an early entry into the records, designating the adult plumage. *Grylloides* of Brünnich represents a variegated condition; and *balthica* of the same author an immature or winter state. *Lacteolus* of the older authors seems to have been based upon the albino condition; the bird being described as "*niveus, rostro pedibusque* ex carneo fuscescentibus." It is possible that Pallas, who introduced the word, may have really based it upon a specimen of *columba;* but this is a point of no special consequence. Bonnaterre has another name,—"*nivea*"—for the same condition, quoting Pallas, Sp. Z. v, p. 33. Brisson and Brehm both have a large number of nominal species, not necessary here to particularize. In 1817, Vieillot (l. suprà cit.) describes an adult under the name of *Uria leucoptera*, erroneously assigning it dimensions nearly equal to those of *Lomvia troile*. At least the presumption is that this *leucoptera* is nothing but a large *grylle*, though he must have been perfectly familiar with the latter. Even so late as 1824, *grylle* is redescribed as *Uria scapularis*.

The "*Uria Mandtii*" of Lichtenstein requires attention, having been extensively quoted as a synonym of, or employed to designate, *U. columba*, as will

be seen by the list of synonyms under head of this species. It is not possible to determine from the description whether *Mandtii* is really based upon *columba* or upon *grylle*. But Dr. Schlegel describes a specimen from Spitzbergen in the Mus. Pays-Bas.—"un des individus types de *l'Uria Mandtii* de Lichtenstein, obtenu du Musée de Berlin," as having the white feathers of the mirror tipped with clear brown, and the wing and the tail feathers faded grayish. This is a common condition of autumnal specimens of *grylle*; and the description does not point more particularly to *columba* than to this species. Upon the whole, it may be best to regard *Mandtii* Licht. as a synonym of *grylle;* though the name as used by Brandt, Bonaparte and some others refers unmistakeably to *columba*.

A certain *Uria unicolor* is described by Faber and Benecken and admitted as distinct in the Comptes Rendus for 1856, by Bonaparte, who moreover places it in a different subgenus from *grylle*. Bonaparte does not use the term to designate *carbo* Pall., which latter he gives as distinct. The name seems to have been based upon the melanotic state of plumage of *grylle*. Dr. Schlegel describes, in the ninth livraison of the Mus. Pays-Bas Catalogues, one of Faber's type specimens from Greenland, as being "Au plumage d'un noir enfumé absolument uniforme."

Uria columba, (*Pallas*) *Cassin*.

Black Guillemot, variety from Kamtschatka, "with a white oblique line issuing from the white spot on the wings," Pennant, Arct. Zool. ii, 1785, p. 517.

Uria grylle, var. B, Latham, Ind. Orn. ii, 1790, p. 797. "Fuliginosa, fascia alarum gemina alba. Lath. Syn. vi, p. 333, No. 3, var. a. Habitat in Aoonalashka."

Colymbus grylle, var. B, Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 872. Quotes Latham and Pennant.

Cepphus columba, Pallas, Zoog. R.-A. 1811, ii, p. 348. "In speciminibus orientali oceani, fascia alarum duplex," etc. (p. 349.)

Uria columba, Cassin, Voy. Vincennes and Peacock, Orn. Atlas, pl. 38, fig. 1. Idem, Baird's B. N. A. 1858, p. 912, pl. 96, fig. 1. Idem, Pr. A. N. S. Phila. 1862, p. 323. Heermann, Pac. R. R. Rep. x, 1859, Route to California, Birds, p. 76. Cooper and Suckley, Pac. R. R. Rep. xii, pt. ii, 1860, p. 285.

?? Uria mandtii, Lichtenstein, Verzeich, 1823, p. 88.

Uria mandtii, Reichenbach, Vollst. Naturg. Schwimmvög, pl. 4, fig. 47. Gray, Genera Birds, iii, 1849, p. 644.

Uria (*Grylle*) *mandtii*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 346.

Uria (*Cephus*) *mandtii*, Bonaparte, Tabl. Comp. Pelag. Comptes Rendus, 1856, xlii, p. 774.

Asiatic and American coasts of the North Pacific, Kamtschatka (Mus. Acad. Philada.), Russian America, Washington Territory, California (Mus. Smiths. Inst.) Breeds on the islands off the coast of California.

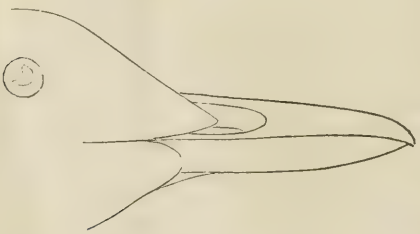

Fig. 14.—*Uria columba*.—Nat. size.

Bill stouter than that of *grylle*, more obtuse at the tip; upper mandible with the culmen straight, or even just appreciably convex, suddenly deflected; rictus straight, ascending to near the tip; gonys and outline of inferior mandibular rami straight.

Adult.—Entirely fuliginous or plumbeous black, with a shade of invisible green. White

mirror on wing coverts. Nearly divided in two by a broad rather curved oblique line of blackish. No white on under wing coverts, these being grayish-brown. Bill and claws black. Mouth and feet vermillion red, tinged with carmine. "Iris white" (label).

Length 13·00; extent 23·00; wing 7·00; tail 2·20; tarsus 1·25; middle toe and claw 1·90, outer do. the same, inner do. 1·45; bill along culmen 1·20, along rictus 1·80, along gonys ·65; depth at base ·40; width ·30.

This species closely resembles *U. grylle;* but differs in being upon an average larger, the wing particularly longer; the bill stouter, straighter, more obtuse at the point; and the marking of the wings different, as above described. The changes of plumage and the individual variations, as exhibited in the large series of specimens examined, and entirely parallel with those of *Uria grylle.*

It is worthy of note that this species occurs, in summer, upon the Pacific coast of America, much south of the corresponding latitudes on the Atlantic coasts frequented at this season by *U. grylle.*

One of the earliest indications, if not the first, of this species, may be recognized in the variety of the Black Guillemot from Kamtschatka, described by Pennant. This is said to have a white oblique line issuing from the white spot on the wing. The var. B of *grylle* of Latham and Donndorff is the same bird. Pallas appears to be the first to bestow a specific name. The question involved in the *Uria Mandtii*, Licht., has already been considered in the preceding article.

Uria carbo, (*Pall.*) *Brandt.*

Cepphus carbo, Pallas, Zoog. R.-A. ii, 1811, p. 350, pl. 79. "C. tridactylus, totus niger, orbites albis," etc.

Uria (*Grylle*) *carbo*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 346. "Tota nigra, pedibus rubris, orbita et stria ab orbites pone oculos ducta albis."

Uria (*Cephus*) *carbo*, Bonaparte, Comptes Rendus, 1856, xlii, p. 774.

Uria carbo, Gray, Genera Birds, 1849, p. 644. Cassin, Baird's B. N. A. 1858, p. 913, pl. 97. Quotes Reich. Vollst. Naturg. Aves., pl. 375, fig. 2937. Cassin, Pr. A. N. S. Philada. 1862, p. 323 (Japan).

Alca carbo, Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 17.

"In oceano orientale circa insulas Aleuticas, præsertim Unalaschka" (Pallas), Kamtschatka (Mus. Acad. Philada.), Japan (Mus. Smiths. Inst.)

Sp. Ch.—Larger than *grylle* and *columba;* the bill especially larger, stouter and straighter. Feathers of nasal fossæ and those around base of lower mandible whitish. A conspicuous white area around eyes, and extending an inch or so behind them. No white on either surface of wings. Rest of plumage brownish-black, becoming ashy black on the under parts; perhaps deep plumbeous black, with a shade of greenish, in more mature specimens than those examined. Bill black. Legs and feet chrome yellow, tinged with vermillion, webs coral red in the dried state; probably vermillion or carmine red in life.

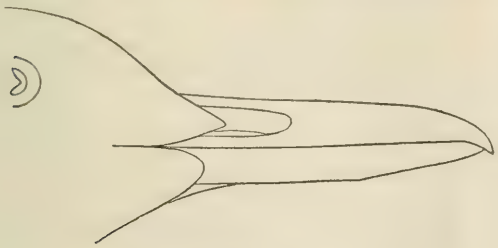

Fig. 15.—*Uria carbo.*—Nat. size.

Length 14 to 15 inches; wing 7·75; tail 2·50; culmen 1·55; commissure 2·20; from feathers on side of lower mandible to tip 1·50, tarsus 1·36; middle toe and claw 2·10, outer 2·00, inner 1·60.

Another specimen: culmen 1·70; commissure 2·10; feathers on side of lower mandible to its tip 1·55; depth of bill at base ·50; width at same point ·38.

An interesting species of *Uria*, easily recognized by its peculiar colors, which are different from those of either of the other two species here described. Although unmistakeably characterized by Pallas, in 1811, as above cited, it seems to have been overlooked by many subsequent writers. It appears, however, in the monograph by Prof. Brandt, who was well acquainted with Pallas' labors and discoveries; and is on different occasions noticed by Mr. Cassin, who has given a figure of it in the Atlas accompanying Prof. Baird's Birds of North America. There is a fine specimen in the Philadelphia Academy, from Kamtschatka; and a mutilated one in the Smithsonian Institution, from Japan. The latter is interesting on account of the new and unusual locality. The bird is chiefly an inhabitant of the higher latitudes on the coasts of the Pacific Ocean. It has not yet become a common bird in collections.

The species is somewhat larger than *grylle* or *columba*, but chiefly noticeable, as far as form is concerned, by the greater stoutness and straightness of the bill, very observable upon direct comparison. The culmen and commissure are nearly straight almost to the very tip, where they are rather suddenly decurved. The gonys and mandibular rami are quite straight; the eminence at their symphysis is well-marked. The nasal fossa is short, but wide and deep; the feathers reach to the nostrils, but do not cover them. These nasal feathers, as well as those around the base of the lower mandible, are dull white. The eyes are conspicuously encircled with white, which stretches behind them for about an inch, tapering to a fine point. There are no indications of white on the wings. With the exceptions just mentioned the whole plumage is sooty-black, tinged with slaty above, with brownish below, and becoming light ashy on the under surfaces of the wings. The bill is black, as in the other species; the inside of the mouth probably carmine red in life. The feet are light yellow in the dried specimens, doubtless vermillion or carmine red in life. The webs are still tinged with this color. The claws are black.

It is possible that the plumage just described is not that of the perfectly adult bird, in which, when fully mature, the white about the sides of the head and base of the bill may not be exactly as here described; and the body colors may be purer and more intense. Dr. Schlegel describes a specimen from the Kurile islands as "d'un noir enfumé uniforme;" and another, from Sachalin island, as an "individu an plumage imparfait; d'un brun fuligineux, passant au blanchâtre sur la face et les côtés de la tête."

LOMVIA, (*Ray*) *Brandt.*

Lomvia, Ray, Syn. Meth. Av., p. 120. Type *L. Hoieri* Ray, (fide Bryant).
Lomvia, Brandt, Bull. Acad. St. Pet. ii, 1837, p. 345. Type *Colymbus troille* Linn.
Cataractes, Moehring, Gen. Av. 1752, p. 68, No. 75. Based on *Lomvia Ins. Farræ Hoeiri.*
Cataractes, Bryant, Monog. Gen. Cataractes, Pr. Bost. Soc. Nat. Hist. 1861. Type *Colymbus troille* Linn.
Alca, Linnæus, Syst. Nat. i, 1758, in part; and of many older authors. Also of Schlegel (1867), in part.
Uria, Brisson, Orn. ii, 1760, p. 377, in part; and of authors generally.
Colymbus, Linnæus, Syst. Nat. i, 1766, in part; and of many older authors.
Cepphus, Pallas, Zoog. R.-A. ii, 1811, p. 345, in part.

Bill shorter than the head, longer than the tarsus, straight, or slightly decurved, usually very slender, much compressed, culmen regularly decurved in its whole length, rictus moderately and very gradually decurved, gonys straight, or even slightly concave in outline, very long, nearly as long as the culmen; a groove in the side of the upper mandible near its tip; commissural edge of upper mandible greatly inflected. Nasal fossæ scarcely apparent, fully feath-

ered, the nostrils wholly obtected by feathers. Feathers on side of lower mandible retreating in a straight line obliquely upwards and backwards from interramal space to rictus. Wings moderately long; tail exceedingly short, the latter contained about three and two-thirds times in the length of the former from carpus to end of longest primary; tail much rounded. Tarsus much compressed, posteriorly and laterally reticulate, anteriorly scutellate, much shorter than the middle toe and claw. Outer and middle toes about equal in length; the claw of the latter much larger than that of the former; tip of inner claw reaching base of middle one. Claws compressed, moderately arched, acute, the outer one not grooved on its outer face, the middle one greatly dilated along its inner edge. A furrow in the plumage behind the eyes.

The genus as here constituted is restricted so as to comprehend only *troile* and the species intimately related. It differs from *Uria* proper in several points, some of them of decided importance. For the benefit of those who may be sceptical regarding the propriety of separating the two forms as genera, their distinctive characters are here antithetically tabulated:

Uria (*grylle*).	Lomvia (*troile*).
Bill about equal to the tarsus; moderately compressed.	Bill much longer than the tarsus; much compressed.
Rictus straight, except just at tip.	Rictus decurved for great part of its length.
Gonys straight, half as long as culmen.	Gonys concave, nearly as long as culmen.
Upper mandible not grooved.	Upper mandible grooved near the tip.
Tomial edges of upper mandible scarcely inflected.	Tomial edges of upper mandible much inflected.
Nasal fossæ wide, deep, mostly naked; nostrils partially covered with feathers.	Nasal fossæ narrow, shallow, feathered; nostrils covered with feathers.
Feathers on side of lower mandible forming a salient rounded outline.	Feathers on side of lower mandible in a straight oblique line.
Tail short, slightly rounded, contained $2\frac{2}{3}$ times in the wing,	Tail very short, much rounded, contained $3\frac{2}{3}$ times in the wing.
Tarsus entirely reticulate.	Tarsus anteriorly scutellate.
Tarsus scarcely shorter than middle toe without claw.	Tarsus much shorter than middle toe without claw.
Outer face of outer claw grooved.	Outer face of outer claw not grooved.
Size moderate; no postocular furrow in the plumage.	Size large; a postocular furrow in the plumage.

Species—(4 ?).

I. Depth of bill opposite nostrils not more than a third of the length of culmen.
- No white on sides of head; bill slender, not dilated at base; culmen, rictus and gonys much curved..... 1. *troile.*
- A white ring and line on sides of head; bill as in *troile* ..... 2. *ringvia.*
- No white on sides of head; bill stout, dilated at base; culmen, rictus and gonys nearly straight..... 3. *californica.*

II. Depth of bill opposite nostrils more than a third of the length of culmen..... 4. *svarbag.*

Lomvia troile, (*Linn.*) *Brandt.*

Lomvia Hoieri, Ray, Syn. Meth. Av., p. 120; fide Bryant.
Uria major, Ger. i, p. 549; fide Bryant.
Plautus rostro tarino, Klein. Av., p. 146, No. 2; fide Bryant.
Colymbus troille, Linnæus, "Fn. Suec., ed. of 1761, No. 109." Idem, Syst. Nat. i, 1766, xii ed. p. 220; not *Uria troille*, Brünn., which is *Alca lomvia*, Linn.,

1758. Gmelin, Syst. Nat. i, pt. ii, p. 788, p. 585; quotes *lomvia* of Brünnich, No. 108. Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 874; confuses the quotations of several species: *e. g.*, quotes *Uria troile*, Lath., and *Alca lomvia* of Linnæus' tenth edition.

Uria troile, Latham, Ind. Orn. ii, 1790, p. 796, No. 1. Retzius, Fn. Suecica, p. 149. Nilsson, Ornith. Suec. 1821, ii, p. 142. Temminck, Man. Orn. ii. 1820, p. 921. Selby, Illust. Brit. Ornith. ii, 1834, p. 420. Reinhardt, Natur. Bidrag, p. 18, No. 87. Gould, B. Eur. v, 1837, pl. 396. Fleming, Hist. Brit. Anim. p. 134. De Kay, N. Y. Zool. 1844, Birds, p. 279. Gray, Genera Birds, iii, 1849, p. 644. Naumann, Naturg. Vög. Deutsch. ix, 1847, pl. 331. Peabody, Rep. Nat. Hist. Mass. Birds, p. 399; confuses *troile* and *ringvia*. Thompson, Nat. Hist. Ireland, iii, 1851, p. 207. Macgillivray, Hist. Brit. Birds, ii, 1852, p. 318. Bryant, Pr. Bost. Soc. N. H. May, 1861, p. 74.

Uria (*Lomvia*) *troile*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 345. Bonaparte, Consp. Gav. Comptes Rendus, 1856, xlii, p. 774.

Catarractes troille, Bryant, Monog. Genus *Cat.* in Pr. Bost. Soc. N. H. 1861, p. 6, fig. 2*a*. Verrill, Proc. B. S. N. H. Oct. 1862, p. 143. Idem, Proc. Essex Inst. iii, 1863, p. 160.

Uria lomvia, Brünnich, Orn. Bor. 1764, p. 27, No. 108; quotes *Alca lomvia*, Willoughby, t. 65. Not *Alca lomvia*, Linn., 1758. Scopoli, Bemerk. Naturg. i, 1777, p. 88, No. 108; fide Donndorff. Keyserling and Blasius, Werbelth. Europ. 1840, p. 238.

Uria (*Cataractes*) *lomvia*, Cassin, Baird's B. N. A. 1858, p. 913. Coues, Pr. A. N. S. Phila. Aug. 1861, p. 256. Boardman, Pr. B. S. N. H. 1862, p. 131.

? Cepphus lomvia, Pallas, Zoog. R.-A. 1811, ii, p. 345; quotes *lomvia*, No. 108, of Brünnich, as ♂, and *svarbag*, No. 110, of Brünnich, as ♀; also quotes *Col. troile* of Linnæus' 12th edition. Perhaps really refers to *californicus*.

Alca lomvia, Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 15. (Not of Linnæus.) Ex parte. Author considers the present and the succeeding species to be varieties of one and the same species. Describes both under same name. Quotes *Uria lomvia* et *swarbeg* [lege svarbag] of Brünnich; *Colymbus troile* of Linnæus; and *Uria rhingvia* [lege ringvia] of Brünnich.

Colymbus minor, Gmelin, S. N. i, pt. ii, 1788, p. 585; confuses three species by describing *troile*, and quoting Brünnich's No. 110 (*svarbag*) and Brünnich's No. 111 (*ringvia*). Donndorff, Beytr. Zool. ii, pt. i, p. 873; confuses three species, by quoting Latham's var. B and Brünnich's Nos. 110, 111. Author's var. γ is true *ringvia*.

Uria minor, Stephens, Shaw's Gen. Zool. xii, 1824, p. 246, pl. 63; erroneously quotes *svarbag*, Brünn.

European and American coasts and islands of the North Atlantic, to or beyond 80° N. On the American coast, breeds from Nova Scotia northward. "Its most favorite breeding-places south of the Straits of Belle Isle, are the Funk Islands, off the coast of Newfoundland, Bird Rock, near the Magdalen Islands, in the Gulf of St. Lawrence, and a number of small islands, generally called Murre Rocks, between Meccatina and the Esquimaux Islands, on the north shore of the Gulf," (Bryant). In winter to the extreme southern coast of New England. Specimens in all American cabinets.

Adult, summer plumage.—Head and neck all around rich dark brown, which changes on the back of the neck into dark slaty-brown, the color of the rest of the upper parts. This hue is nearly uniform, but most of the feathers of the back and rump have usually just appreciably lighter and more grayish-brown tips. Secondaries narrowly, distinctly tipped with pure white. Exposed portion of primaries dusky blackish, the shafts of the few outermost, and the greater part of the inner webs of the whole, lighter (more grayish-brown), tending to grayish-white towards the bases. Under wing coverts mostly white, variegated with dusky along the edges of the wing, and the greater coverts mostly of this latter color. Entire under parts from the throat pure white;

the whole length of the sides under the wings streaked with dusky or slaty-brown. Bill black; mouth yellow; iris brown; legs and feet blackish.

Adult, winter plumage.—As before; the rich brown of the head darker in hue, and more like the rest of the upper parts; the white of the under parts extending to the bill, upon the sides of the head to or slightly above the level of the commissure, upon the side of the neck so far around as to leave only a narrow isthmus of dark color, which is somewhat interrupted by white mottling. The white shades gradually into the darker color, without a trenchant line of demarcation, and varies greatly in its precise outline. Usually a pretty well defined spur of dark color runs out backwards from the eye into the white of the sides of the occiput, the spur occupying the borders of the postocular furrow in the plumage. On the sides of the lower neck, just in advance of the wings, the dark color extends in a point further than it does higher up, showing the extent of the dark brown of the summer vesture.

Young, of the first winter, are colored precisely like the adults, but may be always distinguished by their much shorter and slenderer bills, which are in great part light colored (yellowish). The feet are also much tinged anteriorly with yellowish.

Fledgelings are brownish-dusky, the breast and abdomen white; and with a few dull whitish streaks upon the head and hind neck.

Dimensions.—*Adult.*—Length about 17·00; extent 30·00; wing 8·00; tail 2·25, tarsus 1·40; middle toe and claw 2·10; inner do. 1·70; outer do. 2·00: bill along culmen 1·75, along rictus 2·50; along gonys 1·15; depth at base ·55; width at same point .30. Bill of young, first winter: culmen 1·50; rictus 2·25; gonys ·90; depth at base ·45; width at base ·25.

This species is well known to vary to a certain degree in size, and in the precise shape of the bill. The dimensions above given represent very nearly the average of a large suite of specimens measured. In colors, the variations, though considerable, are unimportant, consisting in the difference in shade of the colors of the upper parts, and the difference in precise outline of the dark and light colors about the head and neck, in summer as well as in winter specimens. Specimens just before the renewal of the feathers have the upper parts distinctly barred or waved with gray, owing to the fading of the tips of the old feathers; and the wing and tail feathers light dull gray. The difference in intensity of coloration depends chiefly upon season, though individual peculiarities may be observed. Very highly plumaged birds have the upper parts almost uniform in hue.

The synonymy of this species is very extensive, and somewhat intricate, though it is possible to collate it with much accuracy and certainty, provided more labor be bestowed than the importance of the matter warrants, as seems to the writer to have been the case in the present instance. In consequence of the peculiarly obvious nature of the characters which distinguish the several closely allied species from the present one, even the brief diagnoses of the most antiquated authors may be recognized and identified, in the majority of instances. But it is curious to note that the various names most in vogue for two or three species of this genus have been so frequently interchanged, and so variously applied, not only in a specific, but in a generic, sense, that they have really come at last to mean nothing more than simply Murre or Guillemot. It is absolutely necessary to refer to a writer's description, or his authorities quoted, before we can have any idea to what species he alludes under any given name;—certainly a very discouraging state of affairs, and one not placing ornithology in a very creditable light.

The present species is Linnæus' *troille*, of Fn. Suec. 1761, and S. N. 1766, and is so regarded by most writers. It is the *lomvia* of Brünnich, which name is usually adopted by those writers who date Linnæus' prerogative of priority at 1766. It is *minor* of Gmelin, who to a description of this species adds the synonyms of two others. It is not *troille* of Brünnich, nor *lomvia* of Linnæus.

LOMVIA RINGVIA, (*Brünn.*) *Brandt.*

Uria ringvia, Brünnich, Orn. Bor. i, 764, p. 28, No. 111; "linea a cantho oculi exteriori per latera capitis nigrantia decurrit alba." Reinhardt, Bidrag. Naturg. p. 18. Naumann, Naturg. Vög. Deutsch. xii, 1847, p. 360, pl. 332. Keyserling and Blasius, Wirbelth. Europ. 1840, p. 238. Gray, Genera Birds, 1849. iii, p. 644. Bryant, Proc. B. S. N. H. 1861, p. 7½.

Uria (*Lomvia*) *ringvia*, Brandt, Bull. Acad. St. Petersb. ii, 1837, p. 345. Bonaparte, Tabl. Comp. Pelagiens, Comptes Rendus, 1856, xlii, p. 774.

Uria (*Cataractes*) *ringvia*, Cassin, Baird's B. N. A. 1858, p. 914. Two of the specimens enumerated belong to *californica*, Bryant. Description that of true *ringvia*. Boardman, Proc. B. S. N. H. Sept. 1862, p. 131.

Catarractes ringvia, Bryant, Monog. Gen. *Cat.* in Pr. Bost. Soc. N. H. 1861, p. 8, fig. 2. Verrill, Pr. B. S. N. H. 1862, p. 143. Id., Pr. Ess. Inst. iii, 1863, p. 160.

Uria alga, Brünnich, Orn. Bor. 1764, p. 28, No. 112. Ringviæ "simillima, exceptis rectricibus totis nigris."

Columbus langvia, "Plaff, Reise n. Isl. p. 562;" fide Bryant.

Colymbus troile, var. β, Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 875; quotes Brünnich's No. 112 (*alga*), and Latham's, No. 1, var. γ (also *alga*).

Colymbus troile, var. γ, Donndorff, Beytr. Zool. ii, pt. i, 1794, p. 876. "Colymbus annulo oculorum et linea pone oculos albis." Quotes Müller, Zool. dan. Prod. p. 19, No. 152*a*.

Uria lachrymans, La Pylaie. "Choris, Voyages Pitt. autour du monde, 23;" fide Bryant. Yarrell, Brit. Birds, iii, p. 351. Temminck, Man. iv, p. 574. Gould, B. Eur. v, 1837, pl. 397. Macgillivray, Hist. Brit. B., ii, 1852, p. 326.

Uria leucopsis, Brehem, "Vög. iii, p. 880."

Uria leucophthalmos, Faber, Isis v. Oken, 1824, p. 146. Thompson, Nat. Hist. Ireland, iii, 1851, p. 211.

Uria troille leucophthalmus, Faber, Prod. Isl. Orn. 1822, p. 42.

Uria troile, Bonaparte, Synopsis, 1828, p. 424. Two species confused. Not *Colymbus troille* Linn., nor *Uria troille* Brünn. Audubon, Orn. Biogr. 1835, iii, p. 142, pl. 218, fig. 1; oct. ed. vii, pl. 473, fig. 1. Figure 2 represents *troile*, of which the author considers the present species to be the adult. Giraud, Birds Long Island, 1844, p. 376.

American and European coasts and islands of the North Atlantic. On the American coast, breeds in the Gulf of St. Lawrence; in winter ranges south to the southern extremity of New England. Habitat the same as that of *troile*, with which it is usually found in intimate association. Spec. in Mus. Acad. Philada., Mus. Smiths. Inst., Cab. G. N. Lawrence.

Absolutely identical with *L. troile*, except in having a white ring around, and white line behind, the eye. The white ring occupies the margins of both eyelids, forming a perfect circle, posteriorly continuous with the white line which occupies the furrow in the plumage, and is an inch or more long.

The changes of plumage of this species, and the individual differences to which it is subject, are absolutely identical with those of *L. troile*. The white ring and line are usually, if not always, present in winter specimens.

The white ring and line are said to be sometimes wanting. But specimens without this character cannot be distinguished from *L. troile*.

None of the specimens contained in American museums offer any grounds for contradiction of the preceding statements.

Such being the facts in the case, each one must be allowed to determine for himself the relationship of *L. ringvia* to *L. troille*, according to the notion he may entertain of species. In forming an opinion, the facts must be borne in mind that the two kinds of Guillemots are always found intimately associated, and that they are known to copulate with each other.

It is probable that the peculiar character upon which the species rests is an individual peculiarity, not a specific difference.

This bird appears to have been first described and named by Brünnich under the designation *ringvia*. *Alga* of this author is the same bird without white

tips to the secondaries. Subsequently several names have been proposed, as will be seen by the synonymy adduced; each based upon the head-markings. The bird has also frequently been described as *troile*, var.

LOMVIA CALIFORNICA, (*Bryant,*) *Coues.*

? Cepphus lomvia, Pallas, Zoog. R.-A. ii, 1811, p. 345, synon. excl.
Uria troile, Newberry, Pacific R. R. Rep. vi, pt. iv, 1857, p. 110. Not of authors. (Coast of California.)
Uria Brünnichii, Heermann, Pacific Rr. Rep. x, 1859, Route to California, Birds, p. 75; synon. excl. Not of authors. (Farrallone Islands.)
Catarractes californicus, Bryant, Monogr. Gen. *Cat.* Pr. Bost. Soc. N. H., 1861, p. 11, figs. 3 and 5. (Farrallone Islands, coast of California.)

Pacific coast of North America. Farrallone Islands, coast of California; breeding; (Mus. Smiths. Inst. and Cab. H. Bryant; the types of the species:) Sitka, Russian America; wintering; Mus. Smiths. Inst.)

Fig. 16.—*Lomvia californica*, (Bry.) Nat. size.

(No. 17404, Mus. Smiths. A type of the species.) Entirely like *troile*, except in the form of the bill. Bill somewhat longer than that of *troile*, on an average; deeper at the base, less decurved towards the tip, the several outlines straighter. Culmen straight to near the tip, then moderately deflexed; rictus almost perfectly straight in its entire length, the commissural edge of the upper mandible toward its base somewhat expanded and everted, as in *svarbag*, though not to the same degree; the feathers on the side of the upper mandible not covering the tomial edge until very near the angula oris; gonys perfectly straight and very long, with a corresponding shortness of the mandibular rami; the angle at symphysis prominent, acute. "Iris white," (collector's label.) Length 16·00; extent 27·00, (label;) wing 8·00; tail 2·25; tarsus 1·40, middle toe and claw 2·25, outer do. 2·10, inner do. 1·70; bill along culmen 1·90, along rictus 2·90, along gonys 1.30; its depth at angle of gonys ·60, its width opposite base of nostrils ·35.

Winter plumage.—(No. 46522, Mus. Smiths. Sitka, Nov. 1866.) In this specimen the bill is shorter (1·75 along culmen) than in the type above described, and the culmen and rictus are more decurved. The peculiar shape, however, is still preserved, the lower mandible being deep and very prominent at the eminentia symphysis. The bird is probably one of the first winter. The plumage is entirely parallel with that of *troile* at the corresponding season. The upper parts are fully as dark as in the average of winter specimens of the latter species. The white of the under parts extends to the bill, and along the edge of the under mandible and eyes. Further back it invades the sides of the occiput and nape, where it is separated from the white of the throat by a prominent well defined spur of dark color protruding from the eye.

As stated by Dr. Bryant, the dark parts of this species are rather paler in tint than the average of those of *troile*. But this is not a diagnostic feature, for it does not hold good in perhaps even a majority of instances. The iris, according to the label, is white; but Dr. Bryant remarks that he can hardly credit this; though if constant it would be a strong character. The only reliable diagnostic features are found in the shape of the bill, as just described. In spite of the moderate amount of individual variation to which the bill is subject, it always preserves its peculiar shape, which is sufficiently different from that of *troile* to attract attention without direct comparison of specimens. One feature which appears to have escaped Dr. Bryant's attention lies in the inflation and eversion of the basal portion of the tomia of the upper mandible, and their comparatively scanty feathering. This is an approach towards the peculiar character of *svarbag*, though by no means attaining such development as in that species. It is readily appreciable in amount in the majority of specimens.

It is worthy of note, that the peculiarities of bill which characterize this species as compared with *troile*, are very much the same as those found in the bill of *U. columba*, as compared with *U. grylle*.

It is also to be observed, that the *ringvia* style of Murre has not been found on the Pacific coast. Should the probability of its non-occurrence become a certainty, the obvious inference would be additional evidence in favor of the specific distinction of *californica*.

Numerous examples of this species are in the Smithsonian Museum, among them Dr. Bryant's types. The bird breeds much further south than its Atlantic representative, occurring in summer on the coast of California.

Among the specimens enumerated in the "Birds of North America" by Mr. Cassin, under head of *Uria ringvia*, are two examples of this species, from California. It is possible that this species rather than *troile* is alluded to by Pallas under the name of *Cepphus lomvia*.

The figure is not a very good representation, the culmen and gonys not being straight enough. The under mandible, however, is well delineated.

LOMVIA SVARBAG, (*Brunn.*) *Coues.*

Alca lomvia, Linnæus, Syst. Nat. Ed. x, 1758, p. 130, No. 4. "Rostro lævi oblongo, mandibula superiore margine flavescente."

Uria lomvia, Bryant, Proc. Bost. Soc. N. H., May, 1861, p. 75. Not of authors, which is generally applied to *troille* Linn.

Catarractes lomvia, Bryant, Mon. Gen. *Cat.* in Pr. B. S. N. H. 1861, p. 9, figs. 1 and 4. Verrill, Proc. Essex Inst. iii, 1863, p. 160.

Uria troille, Brünnich, Orn. Bor. 1764, p. 27, No. 109. "Rostro latiore et breviore, cujus margines, etiam in exsiccatas exuviis, flavescunt." Not *Colymbus troille* Linn.

Uria svarbag, Brünnich, Orn. Bor. 1764, p. 27, No. 110. Winter plumage.

Cepphus arra, Pallas, Zoog. R.-A. ii, 1811, p. 347.

Uria arra, Keyserling and Blasius, Wirb. Europ. 1840, p. 237. Cassin, Pr. A. N. S. Phila. 1862, p. 324. (Northwest coast of America.) Naumann, Naturg. Vög. Deutsch. xii, 1847, p. 536, pl. 333.

Uria (*Lomvia*) *arra*, Bonaparte, Tabl. Comp. Pelag. Comptes Rendus, 1856, xlii, p. 774.

Uria (*Cataractes*) *arra*, Cassin, Baird's B. N. A., 1858, p. 914.

Ulca arra, Schlegel, Urinatores Mus. Pays-Bas, livr. ix, 1867, p. 16.

Uria Brünnichii, Sabine, Trans. Linn. Soc. xii, 1818, p. 538. Temminck, Man. Orn. 1820, ii, p. 924. Bonaparte, Synopsis, 1828, p. 424. Nuttall, Man. Orn. ii, p. 529. Temminck, Man. Orn. ii. p. 576; p. 924. Reinhardt, Natur. Bidrag. p. 18, No. 88. Yarrell, Brit. Birds, p. 348. Swainson and Richardson, F. B. A. 1831, ii, p. 477. Gould, Birds Europ. v, 1837, pl. 398. Audubon, Orn. Biog. iii, 1835, p. 336, pl. 345; oct. ed. vii, pl. 472. Peabody, Rep. Nat. Hist. Mass. Birds, 1840, p. 400. Gray, Gen. Birds, iii, 1849,

p. 644. Thompson, Nat. Hist. Ireland, iii, 1851, p. 213. Macgillivray, Hist. Brit. Birds, ii, 1852, p. 314.

Uria (*Lomvia*) *Brünnichii*, Brandt, Bull. Acad. St. Petersb. 1837, ii, p. 345.

Uria Francsii, Leach, Trans. Linn. Soc. xii, 1818, p. 588. Stephens, Shaw's Gen. Zool. xii, 1824, p. 243, pl. 62, fig. 2. Giraud, Birds Long Island, 1844, p. 377. DeKay, New York Zoolog. Birds, 1844, p. 280. Peabody, Rep. Birds Massachusetts, p. 400.

Uria polaris, Brehm.

Coast of the North Atlantic and Pacific, and of the Arctic Seas. Herald Island, (Mus. Smiths.) In winter, on the American coast south to New Hampshire, (author's Cabinet) and New Jersey, (Mus. Acad. Philada.) Breeds in the Gulf of St. Lawrence, (Bryant.)

Form subtypical of the genus. Bill short, hardly exceeding the tarsus in length of culmen, very stout, wide and deep at the base; culmen curved in its whole length; rictus straight for about half its length, then much deflexed; gonys long, its outline decidedly concave; mandibular rami short, eminentia symphysis very prominent; tomial edges of the upper mandible in their basal half turgid, and entirely bare of feathers. Slightly larger, and rather more robustly organized than *troile*. In other respects of form identical with *troile*: the plumage and its changes also the same. The turgid portion of the tomia of the upper mandible flesh colored in life, becoming yellowish in the dried state.

Length 18·00; extent 32·00; wing 8·50; tail 2·25; tarsus 1·25, middle toe and claw 2·10, outer do. 1·90, inner do. 1·60, bill along culmen 1·40, along rictus 2·20, along gonys ·90, depth at eminentia symphysis ·55, width at base of nostrils ·30, at augula oris ·80.

The peculiar shape of the bill strongly characterizes this species. It is a rather more robust bird than *troile*, and upon an average a little larger. The colors of the plumage are not very appreciably different; perhaps slightly darker, and tending a little more decidedly towards a slaty or plumbeous hue, particularly in winter. The seasonal changes are precisely the same. The only decided difference in color lies in the whitish or yellowish hue of the expanded tomia of the upper mandible.

Brünnich's Guillemot appears to be the most boreal species of the genus, frequenting the Arctic seas, as well as more temperate latitudes. At the same time it has been found further south in winter, on the Atlantic coast of North America, than the other species; and is of frequent occurrence on the United States coast at that season. It is also of constant occurrence in the North Pacific.

This is unquestionably the *Alca lomvia* of Linnæus, 1758. The name should stand for the species, were it not now in use for the genus. It has been more usually employed for *troile*. The *troile* of Brünnich is unmistakeably this species, but is preoccupied by its Linnean application for the common species. *Svarbag*, Brünnich, comes next in order. This is based upon the winter plumage, and must stand as the specific designation of the bird. Pallas named it *Cepphus arra* in 1811; and Sabine renamed it *Uria Brünnichii* in 1818. Both these names, but particularly the latter, are in very general employ at the present day. *Francsii* of Leach, 1818, also this species, has never had much of a run with writers.

D. G. Elliot Esq
With the Author's compliments

A LIST

OF THE

BIRDS OF NEW ENGLAND,

By ELLIOTT COUES,

Assistant Surgeon, U. S. A.

[Reprinted from the Proceedings Essex Institute, Vol. V.]

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1868.

Catalogue of the Birds of North America contained in the Museum of the Essex Institute; — with which is incorporated A List of the Birds of New England. With brief Critical and Field Notes.

By Dr. Elliott Coues, U. S. A.

It is with pleasure that I accede to a request made by Mr. F. W. Putnam, Superintendent of the Museum of the Essex Institute, to identify and prepare a Catalogue of the North American Birds contained in the Collection.

The Ornithological department of the Museum, although not very extensive, so well illustrates, as every local collection should, the species of the immediate vicinity, that, by the addition of a comparatively few desiderata, it may easily be rendered a complete exponent of the Birds of Essex County. Numerous species of other portions of North America, and a number of exotic species are also represented. The entire collection is in a state of preservation rarely equalled in a public museum, and is an encomium upon the scientific taste and enterprise of the community which requires no comment.

In preparing a Catalogue of the Birds of the Essex Institute Museum, I had at first intended merely to present, in addition, a synopsis of the birds of the County of which the collection does not contain examples, for the purpose of showing exactly what were its desiderata among the species of the immediate vicinity. But the Avifauna of the County, with a few exceptions, does not differ in a notable degree from that of the State at large; of which so many excellent lists have already appeared, that an additional one would be entirely superfluous.*

There are also at our disposal several other local lists of various localities throughout New England. It has

*That of Mr. J. A. Allen's, in particular, would be difficult to improve upon as regards completeness, accuracy, and interest; and is, I think, one of the most perfect samples of a local list I have ever had the pleasure of perusing.

occurred to me that a paper which should combine these different catalogues, or in other words present a complete list of the Birds found in New England was still a desideratum, and might prove an acceptable contribution to Ornithology. I have accordingly endeavored to render the following pages an exposition of the present state of our knowledge as regards the distribution of species in this section of the country.

A simple enumeration of the names of species known to occur, without regard to special points concerning each of them, is, as has been frequently and justly remarked, of comparatively little value in determining the real characteristics of the Fauna of any particular locality. For among the species represented, some are purely accidental, and others only occasional or very rare visitors, whose occurrence is entirely exceptional, and contrary to the law ordinarily regulating their habits and distribution. A very large proportion are species which only pass through the region during their migrations; and of those which regularly summer or winter, or are permanent residents, some are very abundant, and, so to speak, characteristic, while others are of comparatively infrequent occurrence. The value of a local list seems to me to depend in a great measure upon the just discrimination of these several classes; and cannot be said to approach completion unless these points are fully elucidated.

I have experienced some little difficulty in attempting to fulfil this indication, in consequence of the extent of country whose birds are to be presented. Within the area of New England, as is well known to those familiar with the distribution of our species, are represented portions of two Faunæ* which differ in many respects from each other. There seems to be a natural dividing line between the birds of Massachusetts and Southern New England generally, and those of the more northern portions of the Eastern States. Numerous species which enter New England in spring, to breed

*The "Canadian" and "Alleghanian."—Professor Verrill's paper on the birds of Norway, Me., contains some interesting remarks upon this subject.

there, do not proceed, as a general rule, farther north than Massachusetts; and many others, properly to be regarded as stragglers from the South in summer and early autumn, are rarely if ever found beyond the latitude of this State. In like manner, many of the regular winter visitants of Maine are of rare or only occasional occurrence, or are not found at all much farther south. Again, many species hardly known in Massachusetts and southward except as migratory species passing through in spring and autumn, are in Maine regular summer visitants, breeding abundantly. Other minor differences, resulting from latitude and physical geography, will readily be brought to mind by attentive consideration of the subject, and therefore need not be here detailed. It will be evident that a due regard for these important points has necessitated, in the case of almost every species in the list, remarks elucidative of the special part it plays in the composition of the Avifauna.

In the following list the New England species are given in *italics*, and those contained in the Museum of the Institute are followed by the numbers and localities of the specimens in the collection. All other North American species represented in the Museum are printed in "Roman." The list is thus made an exponent of the present condition of the Museum so far as North American birds are concerned, without interference with its character as a synopsis of those of New England. The nomenclature adopted is mainly that of Professor Baird's "Birds of North America," with such modifications as my own investigations have led me to adopt.

I take pleasure in acknowledging the free use I have made of previously published local lists, for obtaining data relative to the comparative abundance or scarcity of species, their times of arrival and departure, and for information upon particular points which a general knowledge of the distribution of species does not afford. Information relative to the accidental occurrence of species in particular localities must necessarily be chiefly drawn from these sources; and I have in every such instance been careful to insert references. For all statements for

which no authority is cited, and for the identifications of specimens in the Museum, I am solely responsible.

The reader is referred to the following authorities for corroborative or additional information upon the subject:

EMM.—Prof. E. Emmons; Catalogue of the Birds of Massachusetts. Hitchcock's Report. Amherst, 1835.

BREW.—Dr. T. M. Brewer; Some additions to the Catalogue of the Birds of Massachusetts, in Hitchcock's Report. Boston Journal of Natural History, vol. i, p. 435. 1837.

PEAB.—Rev. W. B. O. Peabody; Report on the Birds of Massachusetts. Published agreeably to an order of the Legislature. 8vo. Boston, 1839.

THOMPS.—Zadock Thompson; History of Vermont, Natural, Civil, and Statistical, chap. viii, p. 56. 8vo. Burlington, 1842.

LINS.—Rev. J. H. Linsley; Catalogue of the Birds of Connecticut. American Journal of Science and Arts, vol. xliv, p. 249. 1843.

PUTN.—F. W. Putnam; Catalogue of the Birds of Essex Co., Mass., with an Appendix containing other species of the State. Proceedings of the Essex Institute, vol. i, p. 201. With notes by Mr. S. Jillson. 1856.

WOOD.—Dr. W. Wood; Rapacious Birds of Connecticut. Hartford Times, March 14 to Aug. 9, 1861.

VERR.—Prof. A. E. Verrill; Catalogue of the Birds found at Norway, Me. With a list of the Birds found in Maine not observed at Norway. Proceedings of the Essex Institute, vol. iii, p, 136. 1862. (Repaged.)

BOARDM.—G. A. Boardman; Catalogue of the birds found in the vicinity of Calais, Maine, and about the Islands at the mouth of the Bay of Fundy. Edited by A. E. Verrill. Proceedings of the Boston Society of Natural History, vol. ix, p. 122. 1862.

VERR.—Prof. A. E. Verrill; Additions to the Catalogue of the Birds found in the vicinity of Calais, Maine, and about the Bay of Fundy. Proceedings of the Boston Society of Natural History, vol. ix, p. 233. 1863.

SAM.—E. A. Samuels;* Descriptive Catalogue of the Birds of Massachusetts. Boston, 1864. Appendix to Report of Secretary of Agriculture, Mass., for 1863. (Repaged.)

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* This author has recently published a more extensive work on the Birds of New England; but his "Catalogue" is much more complete, as far as it goes, and otherwise more satisfactory, than his more pretentious volume. The latter,—entitled "Ornithology and Oölogy of New England; containing full descriptions of the Birds of New England, and adjoining States and provinces, arranged by a long-approved classification and nomenclature; together with a complete history of their habits, times of arrival and departure, their distribution, food, song, time of breeding, and a careful and accurate account of their nests and eggs; with Illustrations of many species of the Birds, and accurate Figures of their Eggs"—is not by any means what we should expect to find it, from its title. We are constrained to regard it as a work that only very imperfectly and inadequately represents, and therefore cannot become an authority upon, the subject. The descriptions are very good, and are copied from Prof. Baird's work. Many of the biographies are excellent, and are copied from Wilson, Audubon, Nuttall, and others. Nearly all the wood-cuts are reproduced from Audubon, and most of them have already been used before, in a government Report. They are as much like Audubon's originals as could be expected under the circumstances. The colored plates of the eggs are the best things in the book; it is much to be regretted that only thirty eggs are illustrated; also that the writer has been able to describe the nests, eggs, and breeding habits of

ALL.—J. A. Allen; Catalogue of the Birds of Springfield, Mass., with a list of Birds found in Massachusetts not observed at Springfield. Proceedings of the Essex Institute, vol. iv, p. 48. 1864.

HAM.—Prof. C. E. Hamlin; Catalogue of the Birds found in the vicinity of Waterville, Kennebec Co., Me. Reprinted from the Report of the Secretary of the Maine Board of Agriculture for 1865.

McIL.—T. McIlwraith; List of Birds observed near Hamilton, Canada West. Proceedings of the Essex Institute, v, p. 79. 1866.

LAWR.—G. N. Lawrence; Catalogue of Birds observed on New York, Long and Staten Islands, and adjacent parts of New Jersey. Annals of the Lyceum of Natural History of New York, vol. viii. 1866.

B. S. N. H.—Proceedings of the Boston Society of Natural History. 8vo. Boston, 1841, et seq. *passim.* Various papers and notes on New England Birds, by Drs. Abbot, Brewer, Bryant, Cabot, Kneeland, and others. Especially vols. ii, pp. 36, 248; iii, pp. 136, 313, 326, 333, 335; iv, p. 346; v, pp. 154, 195; vi, pp. 386, 419, etc.

In addition to the preceding, numerous references to Birds of New England are to be found in Nuttall's Manual of Ornithology; in the Biographies of Audubon; in Brewer's North American Oölogy; in the Birds of North America by Baird, Cassin, and Lawrence; and in Baird's Review of American Birds.

VULTURIDÆ.

Cathartes aura Illig.—Turkey Vulture. Turkey Buzzard. Rare or occasional summer visitant, chiefly in more southern portions. (Calais, Me., *Verr.*, p. 122; one instance.—Mass., two instances, *Sam.*, p. 3; *All.*, p. 81. —Regular summer visitant near Chatham, and along the shores of Lake St. Clair. *McIl.*, p. 80.—Omitted from *Sam. O. O.*)

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so very small a per centage of the New England birds. The original portions of the text are not better, nor much worse than the average of ornithological writings as regards style, accuracy, and completeness. But the great blemish of the work is the omission of thirty or forty species properly to be enumerated as Birds of New England. We can find no excuse for such carelessness as this. We cannot attribute it to Mr. Samuels' want of knowledge in the matter; for surely he cannot be ignorant of Mr. Putnam's, Mr. Boardman's, Prof. Verrill's, Mr. Allen's, and others' local lists,—not to mention his own "Descriptive List," in which several species are given that do not appear in his latter work,—either of which would put him in possession of much additional matter for his work. It is not to the point that many, or most, of the species he omits are rare, occasional, or accidental visitors in New England. Such a work as his professes to be should at least make mention of every bird that has actually been found in New England "and adjoining States and provinces."

In the present list—perhaps more needed since, than before the appearance of Mr. Samuels' work—we notice Mr. Samuel's omissions in detail; and the reader is left to judge for himself, in each instance, what sort of authority we have for including those species that we condemn Mr. Samuels for omitting. We quote Mr. Samuels' later work as "*Sam. O. O.*" to distinguish it from his Descriptive List, referred to by the abbreviation "*Sam.*"

Cathartes atratus Less. — Black Vulture. Carrion Crow. Entirely accidental. (Swampscott, Nov. 1850, *S. Jillson*, quoted by *Putn.*, p. 223. — Gloucester, Sept. 28, 1863, *Verrill*, quoted by *All.*, p. 81. — *Brew.* Oöl., p. 5. — Omitted from *Sam. O. O.*)

FALCONIDÆ.

*Falco anatum** Bon. — American Peregrine Falcon. Duck Hawk. Resident and generally distributed, though nowhere very abundant. Chiefly a winter visitant in more southern localities, though known to breed in Mass. and Ct. (Near Springfield, Mass., *C. W. Bennett*, quoted by *All.*, p. 50. — Near Hartford, Ct., *W. Wood*, in Hartf. "Times," June 24, 1861.) Regularly breeds in various portions of Maine.

It is very questionable whether this bird be more than a geographical race or variety of the Old World *F. peregrinus*. Numerous other forms (among them *F. nigriceps* Cass., from western North America), from various parts of the world, are known to exist, all of which are intimately related to the European bird.

No. 11, ♀, adult. Off Bermuda, Capt. George Upton, Oct. 29, 1849.

Falco sacer Forster. — Jerfalcon or Gyrfalcon. "White" or "Speckled" Hawk. — Rare winter visitant; and only accidental as far south as Mass. I cannot find an authentic instance of its breeding in New England. (Norway, Me., "not uncommon;" *Verr.*, p. 4. — Mass., *Peab.*, p. 260. — Sekonk Plains, Mass., *Jillson*, quoted by *Putn.*, p. 226, and by the other State authorities. — Omitted from *Sam. O. O.*)

The Jerfalcon which visits New England is variously given as "*Islandicus*" or "*candicans*." I do not know which is really the proper name, nor whether more than one species be found. I believe it is still an open question among ornithologists, whether these two names do not refer to the same species; or in other words whether there is really more than a single valid species of Jer-

*For some exceedingly interesting information upon the habits and especially the nidification of this Hawk, see Allen, Pr. E. I., 1865, p. 153.

falcon. Mr. John Cassin, in reply to some inquiries of mine upon this subject, kindly furnishes me with the following: "I regard the species of *Hierofalco* of northern America as the *F. candicans* of authors (e. g. Bon. Consp. Av., etc.).—*F. cinereus* Gmelin; *F. Grœnlandicus* Daudin; *F. Labradora* Aud. (name on plate); *F. sacer* Forster; which latter is the name which has priority."

Falco columbarius Gm.—Pigeon Hawk. Generally distributed. Not abundant. Resident. Breeds at least as far south as Massachusetts.—(*Sam.*, p. 3.) It ranges through the Middle and into the Southern States in winter.

The "Little Corporal" *F. temerarius* Aud., Nutt., of *Peab.* (p. 261; *Lins.*, p. 251), is based upon this species in one of its protean plumages, when its upper parts are light slate-blue, as occurs chiefly in very adult birds. There is possibly a second species of *Hypotriorchis*, the European *F. æsalon*. Examine in this connection *Coues*, Pr. A. N. S., Phila., 1866, p. 42; and for the occurrence of supposed *æsalon* in Mass., see *Peab.* (p. 270), who quotes Nuttall as authority.

No. 17, ♂, adult. Essex Co. H. P. Ives, Sept. 25, 1858.
No. 36, young. Essex Co. Thomas H. Johnson, 1861.

Falco sparverius Linn.—Sparrow Hawk. Resident. Generally distributed and common; breeds throughout New England.

No. 16, ♂, adult. Essex Co. George Goldthwait.

Falco aurantius Gm.—I find an excellent example of this species in the collection.

No. 43, Brazil.

Astur atricapillus Bon.—Goshawk. "Partridge" Hawk. Generally distributed. Chiefly winter visitant, and rather uncommon in southern portions; common, and breeds, in Maine. I have also found it breeding in Labrador. Individuals in the adult blue plumage are rarely seen in Mass. (Norway, Me., "common, breeds," *Verr.*, p. 5.)

No. 22, ♂, adult. Essex Co. S. Jillson, 1853.
No. 292, ♂. Boxford, Essex Co. Thomas Fuller, Nov. 5, 1867.
No. 293, ♀, young. Topsfield, Essex Co. Mrs. Killam, Nov. 5, 1867.
No. 18, young. Lynn, Essex Co. S. Jillson, 1858.

Accipiter Cooperii Bon.—Cooper's Hawk. "Chicken

Hawk." Resident. Common in most localities. Most numerous in summer, breeding; probably the greater number retire south in winter.

No. 44. Essex Co.

Accipiter fuscus Bon. — Sharp-shinned Hawk. "Pigeon Hawk." Abundant. Resident in more southern localities, summer visitant further north. The Maine authorities do not give it as wintering in that State.

This species, in common with *F. columbarius*, has received the popular name of "Pigeon Hawk"; and local naturalists should be careful to state which of the two species they refer to in using the latter appellation. It seems that some errors of identification have arisen from inattention to this point.

No. 12, ♀. Essex Co. N. Vickary, 1860.
No. 13, ♀. Essex Co.
No. 14, ♂, adult. Essex Co.
No. 15, ♂, young. Essex Co.

Buteo borealis Vieill. — Red-tailed Buzzard. "Hen Hawk." Abundant. It probably retires from extreme northern sections in the depth of winter.

No. 4, ♂, adult. Middleton, Essex Co. Mrs. E. R. Colcord, Aug. 14, 1851.

Buteo lineatus Jard. — Red-shouldered Buzzard. "Hen Hawk." Abundant. Breeds. Resident, except in extreme northern sections, whence it retires in winter.

The large size of some northern examples, compared with others from Southern United States, has induced Prof. Verrill (p. 5) to recognize a variety *hyemalis* ex Gm.* of this species. Considered as simply expressive of an instance of the law regarding size now well known to obtain, such a procedure is entirely pertinent; but I am disinclined to allow that the differences are of the kind or degree to which are usually accorded a name, and the rank of a distinct "variety."

The "*Falco buteoides*" (Nutt., Man., 1st ed., 1832, i, p.

*F. *hyemalis* Gm. is generally supposed to have been based upon the young *lineatus*, in which plumage the under parts are white, not reddish. This condition was usually regarded by our earlier ornithologists as constituting a species distinct from *lineatus*, — the "Winter Falcon," *F. hyemalis* Wils., Aud., Nutt., etc.

100), given by *Peab.*, p. 268, and *Linsley*, p. 252, is now well known to be the young of this species. Nuttall himself, in the second edition of his Manual, gives it as a synonym of the *B.* "*hyemalis*" (= *lineatus*, juv.).

No. 3, ♂, adult. Winter plumage. Essex Co.
No. 678 ♀, adult. Danvers, Essex Co. J. H. Sears, Apr. 13, 1868. (Shot on the nest. Eggs.)

Buteo Pennsylvanicus Bon.—Broad-winged Buzzard. Generally distributed. Common; being very abundant in some localities (*e. g.* Umbagog Lakes, *Verr.*, p. 6). Resident; with much the same qualification as given under head of previous species.

In addition to the preceding *Buteones* the *B. Bairdii* Hoy, originally described from Wisconsin, which has been found in Canada West by Mr. T. McIlwraith, may very possibly occur in North-western New England. *Buteo Bairdii* is one of several usually recognized species which Dr. H. Bryant (Pr. B. S. N. H., 1861) is inclined to coalesce as a single species under the name of *B. Harlani* Aud., or rather *B. Swainsonii* Bon., since it is probable that Audubon's name was based upon quite a different species. (Vide infra, under head of *Archibuteo Sancti-Johannis.*) But whether *Bairdii* be permanently distinct or not, does not affect the question of its introduction into the New England Fauna.

Mr. McIlwraith gives *Buteo elegans* Cassin, as a bird of Canada West. "I have a fine specimen in adult plumage, which was shot at Baptiste Creek a few years since." So far as we are at present acquainted with the range of this species it is quite impossible for me to think that it should occur there; and I am inclined to believe, from the nature of Mr. M.'s remarks, that the specimen in question is merely a somewhat unusually dark-colored example of *lineatus*.

Archibuteo lagopus Gray.—Rough-legged Hawk. Winter visitant. Not ordinarily abundant. I can learn of no authentic instances of its breeding, although it probably does so in more northern sections. "*F. Sancti-Johannis*" of Linsley's list.

No. 1, ♂, adult. Salem, Essex Co. J. Rose, Nov. 1854.
No. 2, ♀, adult. " " " " " " "
No. 298, adult. Hamilton, Essex Co. Mr. Burchstead, Feb. 21, 1867.

Archibuteo Sancti-Johannis Gray.—Black Hawk. Winter visitant. Appears to be nowhere abundant. Not recorded as breeding. I have seen it in summer in Labrador. Very possibly it breeds in the northern districts of Maine.

The "Black Warrior, *Falco Harlani* Aud.," which has been accredited to Massachusetts, apparently upon Nuttall's authority (*Emm.*, p. 1; *Peab.*, p. 269; *Putn.*, p. 225), should in all probability be considered as this species. *Harlani* of Audubon, according to G. R. Gray, who has examined the type specimen in the British Museum, is based upon a dark state of plumage of the western *B. montanus* Nutt.; which latter itself may not be specifically distinct from *borealis* Gm. At the same time Mr. Peabody, following Audubon, does not separate *Sancti-Johannis* from *lagopus*. Upon these points see *Bryant*, Pr. B. S. N. H., 1861; and *Coues*, Pr. A. N. S. Phila., 1866, pp. 44, 45. Still the bird may have been an unusually dark-plumaged *B. Swainsonii*, which, as I have just stated above, may possibly occur in New England.

Circus Hudsonicus Vieill.—Hen Harrier. Marsh Hawk. Blue Hawk. Summer resident, breeding abundantly. Perhaps some winter in more southern localities.

No. 9, ♂. Essex Co. Mr. Houghton.
No. 10, ♀. " " " "

Aquila Canadensis Cass. ("Falco fulvus" of some earlier American writers.)—Golden Eagle. Ring-tailed Eagle. Very rare winter visitant, occurring usually in isolated instances. Probably does not breed in New England. Specimens are taken nearly every winter at Washington, D. C.

No. 7, nearly adult. Essex Co.

Haliaëtus leucocephalus Savig.—White-headed Eagle. "Bald" Eagle. Common. Resident. Mr. Samuels' statement that it does not breed in Mass. is incorrect; vide *All.*, p. 51. (Mt. Tom, Mass.) I know it to breed as far south, at least, as Washington, D. C.

No. 5, ♂, adult. Essex Co. S. Jillson.
No. 6, young. Essex Co. Mr. Houghton.
No. 8, young. Essex Co. Mr. Burchstead.

The *H.* "*Washingtonii*" Aud., has been repeatedly attributed to New England. (*Emm.*, p. 1; *Peab.*, p. 262; *Lins.*, p. 251; *Putn.*, p. 226; but upon what authority is not apparent.) "I have been told by an old hunter, of an Eagle of a much larger size, killed in this region [Norway, Me.], which may have been the little known Washington Eagle of Mr. Audubon" (*Verr.*, p. 7). The species is omitted from recent lists. I refrain from comments, since, like all else that has been written and said of this bird, they would be merely threadbare conjectures.

Pandion Carolinensis Bon.—Fish Hawk. Summer resident. Not abundant. Generally distributed; but chiefly occurring over the inland Lakes and Rivers.

No. 37, adult. Essex Co., 1861.
No. 294, ♀, adult. Salem, Essex Co. H. F. Shepard, Sept. 25, 1867.

STRIGIDÆ.

Otus Wilsonianus Less.—Long-eared Owl. Abundant. Resident throughout New England. Mr. Allen (p. 51) urges the adoption of *S. Americana* Gm. (S. N; i, 1788, p. 288) for this species. Gmelin's diagnosis is not exclusively pertinent; and he says moreover that his species "habitat in America *australi*." I see no reason to supersede a definite and now well-established name for one to which, to say the least, considerable uncertainty attaches. The *Strix Americana* Audubon (Orn. Biog. iii, 1834, p. 421) is a very different species; to wit, the *pratincola* of Bonaparte.

No. 25. Essex Co. Autumn of 1859.

Brachyotus Cassinii Brew. (Proc. B. S. N. H., 1866, p. 321.)—Short-eared Owl. Common resident; breeding, and, so far as we know, wintering in all sections. Upon the question of the specific distinction of the American from the European, Mr. Cassin writes me: "It is larger than the European, and darker colored;—very much like it, though!"

No. 23. Essex Co. N. Vickary, 1854.
No. 24, ♀. Essex Co. B. Grover, 1854.
No. 295, ♂. Salem, Essex Co. D. P. Waters, Oct. 25, 1867.

Syrnium cinereum Aud.—Great Gray Owl. A rare winter visitant. Found in winter throughout New England; but probably to be regarded as only a straggler to its more southern portions. None have been observed to breed in New England.

No. 31. Salem, Essex Co. F. W. Putnam, Winter of 1866–7.
No. 34. Wenham, Essex Co. James Bartlett, Feb. 1859.

Syrnium nebulosum Gray.—Barred Owl. Abundant. Resident in all portions of New England.

No. 26, ♀, adult. Essex Co. James Buffington, Nov. 27, 1854.
No. 190. Salem, Essex Co. E. S. Waters, Nov. 10, 1866.

Bubo Virginianus Bon.—Great Horned Owl. Common. Resident.

The *Strix* "*arctica* Richardson," enumerated as a bird of Massachusetts (*Peab.*, p. 276, and *Putn.*, p. 226) on the authority of Mr. Nuttall, undoubtedly refers to this species in the albescent state of plumage, which constitutes Mr. Cassin's B. Virginianus var. *arcticus*. The "*Strix scandiaca* Linn.," of Linsley's list (p. 253) in all probability was also based upon the same variety of *Virginianus*.

No. 33, ♂. Essex Co. T. Ropes, Oct. 1849.
No. 32, ♀. Lynn, Essex Co. J. Saul, Feb. 28, 1864.

Scops asio Bon.—Mottled Owl. Red Owl. Screech Owl. Abundant everywhere. Resident.

No. 27, ♀. (Grey plumage.) Essex Co. H. P. Ives, Nov. 1854.
No. 28. (Red plumage.) Essex Co. S. Jillson, 1858.

Nyctale Acadica Bon.—Acadian Owl. Common; especially in more northern sections of the country. Resident.

No. 29, ♂. Essex Co. S. Jillson, 1858.
No. 30, ♀. " " " " "

Nyctale Richardsoni Bon.—Richardson's Owl. ("*Ulula Tengmalmi*" Audubon, and earlier authors.) Not abundant. Chiefly a winter visitant, and rare as far south as Massachusetts. It is probably resident in the north of Maine; though not, I believe, actually observed to breed. There are repeated instances of its occurrence in winter in the southernmost New England States.

Nyctale albifrons Cassin.—Kirtland's Owl. I have

found no record of the occurrence of this species in New England, but from its known range it is undoubtedly to be found there, at least in winter, even if it does not reside permanently in the more northern portion.

Nyctea nivea Gray. — Snowy Owl. Winter resident; usually rare, but at irregular intervals not uncommon even in the southern portions of New England. It sometimes straggles even to South Carolina.

No. 45, ♂. Salem, Essex Co. E. G. Symonds, Jan. 1863.
No. 35, ♀. Beverly, Essex Co. Dr. C. B. Haddock, Nov. 27, 1854.
No. 299, adult. Wenham, Essex Co. John J. Gould, Apr. 9, 1868.

Surnia ulula Bon. — Hawk Owl. Winter resident. Of regular and rather common occurrence in Maine; but in more southern localities rare, and perhaps only accidental. It extends however throughout New England.

ATHENE HYPOGÆA Bon. — Prairie Owl. Burrowing Owl.

No. 96. Colorado Mts., west of Denver City. From the Chicago Academy of Science, 1864.

CUCULIDÆ.

Coccygus Americanus Bon. — Yellow-billed Cuckoo. Summer resident. Not abundant; and in particular localities very rare. (Extremely rare, Springfield, Mass., *All.*, p. 52). The species extends northward into Canada. (One specimen. Hamilton, C. W., *McIl.*, p. 82.)

No. 744, adult. Essex Co.

Coccygus erythrophthalmus Bon. — Black-billed Cuckoo. Summer resident. Common; being, according to the testimony of all observers, much more numerous than the preceding species, and, like it, extending into Canada.

At Washington, D. C., *Americanus* is very abundant, and the present species comparatively rare.

No. 745, adult. Essex Co.
No. 746, adult. Salem, Essex Co. John S. Ives, June, 1859.

PICIDÆ.

Picus villosus Linn. — Hairy woodpecker. Resident. Abundant in most localities. *Picus Phillipsii* Aud., given by *Putn.*, p. 229, is the young of this species.

Picus pubescens Linn. — Downy Woodpecker. Resident, and everywhere abundant.

No. 905, ♂. Essex Co. E. P. Emmerton, Nov. 27, 1854.
No. 906, ♀. " " S. Jillson, 1858.

Picoides arcticus Gray. — Black-backed Three-toed Woodpecker. Winter resident; not known to breed within the limits of New England. ("Probably breeds." Calais, Me., *Boardm.*, p. 122.) Extends through all its States in winter, but is very rare or even accidental in the southernmost. (Springfield, Mass., *All.*, p. 52.)

No. 901, ♂. Essex Co.
No. 902, ♀. " " S. Jillson, Nov. 21, 1855.

Picoides hirsutus Gray. — Banded Three-toed Woodpecker. A very rare winter visitant; probably only stragglers reach as far as Massachusetts. (Calais, Me., G. A. Boardman, in *Verr.*, p. 21. — Mass., *Brew.*, p. 437; *Putn.*, p. 229; *Sam.*, p. 4; *All.*, p. 82.)

Sphyrapicus varius Baird. — Yellow-bellied Woodpecker. Summer resident. Common in most localities. Extends northward into Canada. A few probably winter in the more southern portions.

No. 907, ♂, adult. Essex Co. S. Jillson, 1855.
No. 908, ♀, adult. " " " " "
No. 909, ♂, young. " " " " "

Hylotomus pileatus Baird. — Pileated Woodpecker. Black Log-cock. Generally distributed, and resident, in all well-wooded portions of New England, though apparently nowhere abundant. It is a shy, wild, and retiring species, and one that disappears more rapidly than almost any other with the clearing away of forests.

No. 887, ♂, adult. New Hampshire.

Centurus Carolinus Swains. — Red-bellied Woodpecker. A rare and perhaps only accidental summer visitor to the more southern portions. (Western Mass., "breeding," *Emm.* Springfield "accidental, May 13, 1863," *All.*, p. 53. "Said to be unknown in the eastern part of the State," *Peab.*, p. 336. "One specimen, Stratford, Conn., Oct. 16, 1842," *Lins.*, p. 263. Omitted from *Sam. O. O.*) I do not find it recorded from Maine or New Hampshire.

No. 904, ♂, adult. Locality unknown.

Melanerpes erythrocephalus Swainson. — Red-headed Woodpecker. Rare summer visitant. Comparisons of the older with more recent local authorities indicate that the species is now much less numerous than formerly. The majority of individuals do not seem to pass the Middle States in their vernal migration.

No. 903, ♂, adult. Essex Co. S. Jillson, 1855.

Colaptes auratus Swains. — Golden-winged Woodpecker. "Flicker," "Yucker," "High-holder," "Wake-up." A very common summer resident.

No. 896, ♂, adult. Essex Co. S. Jillson, 1855.
No. 897, ♀, " " " " " "

COLAPTES MEXICANUS Swains. — Red-winged Flicker.

No. 97. Fort Buchanan, Dr. Dewey; from the Chicago Academy of Science, 1864.

TROCHILIDÆ.

Trochilus colubris Linn. — Ruby-throated Hummingbird. Summer resident. Common throughout New England.

No. 300, ♂, adult. Essex Co. S. Jillson, 1853.
No. 301, ♀, " " " " " "

CYPSELIDÆ.

Chætura pelasgia Steph. — Chimney Swift. Summer resident. Abundant.

No. 320, ♂, adult. Essex Co. S. Jillson, 1856.
No. 321, ♀, " " " " " "
No. 322. Essex Co.

CAPRIMULGIDÆ.

Antrostomus vociferus Bon. — Whip-poor-will. Common summer resident.

No. 323, adult. Essex Co. S. Jillson, 1856.

Chordeiles popetue Baird. — Night-hawk. "Bull-bat." Common summer resident.

No. 324, adult. Essex Co. S. Jillson, 1856.

HALCYONIDÆ.

Ceryle alcyon Boie. — King-fisher. Common summer

resident; but a few usually remain all winter. (*Verr.*, p. 9; *All.*, p. 54.) The species extends as far north as Labrador.

No. 325, adult. Essex Co. S. Jillson, 1859.

COLOPTERIDÆ.

MILVULUS TYRANNUS Bon.—Fork-tailed Fly-catcher. A fine example in the collection, from South America.

Tyrannus Carolinensis Baird.—King-bird. Bee-martin. Abundant summer resident.

No. 340, adult. Essex Co. S. Jillson.
No. 567, ♀, adult. " "

TYRANNUS VERTICALIS Say.—Arkansas Fly-catcher.

No. 102, adult. Farm Island, Nebraska. Dr. F. V. Hayden. From the Chicago Academy of Science, 1864.

Myiarchus crinitus Cab.—Great Crested Fly-catcher. Summer visitant; rather rare.

No. 332, ♂, adult. Essex Co. S. Jillson, 1855.
No. 334, ♀, " " " " " "

Sayornis fuscus Baird.—Pewit Fly-catcher. "Phœbe." Common summer resident. Here, as elsewhere, it is the avant-courier in spring of the small insectivorous birds. The kinds of insects upon which it chiefly delights to feed account for its early appearance, as well as for its choice of the situations it usually frequents.

No. 560, ♂, adult. Essex Co. S. Jillson, 1853.
No. 548, ♀, " " " " " "

Contopus borealis Baird.—Olive-sided Flycatcher. Cooper's Flycatcher. Summer visitant. Not abundant. "Quite common at the Umbagog Lakes." (*Verr.*, p. 10.)

No. 558, adult. Essex Co. S. Jillson, 1855.

Contopus virens Cab.—Wood Pewee. Abundant. Summer resident. Rather less numerous in the northern than in the southern sections.

No. 565, ♂, Essex Co. T. M. Pond, 1863.
No. 561, ♀, " " S. Jillson.

Empidonax Acadicus Baird.—Acadian Flycatcher. Summer resident. Not abundant. This species seems to be more restricted in its northern range than the others of the genus, apparently not proceeding much farther than

Massachusetts. It is not, I believe, recorded from Maine. But Mr. Samuels erroneously omits it from his Massachusetts list. Earlier authors speak of it as being very common, but so far as I can learn it is now quite rare. At Washington, D. C., it is by far the most abundant species of the genus.

Empidonax Traillii Baird. — Traill's Flycatcher. Summer resident; not abundant. Erroneously omitted from Mr. Putnam's list, though given by previous and subsequent authors.

Empidonax minimus Baird. — Least Flycatcher. Summer visitant. Abundant, especially in Massachusetts, where it "exceeds in abundance all the other *Empidonaces* taken together" (*All.*, p. 54). It has a very extensive northern range; — quite into arctic America.

The earlier authors appear to have always mistaken this species for *Acadicus*, and this is the reason they used to speak of the latter as being abundant. (See *Brewer*, Am. Nat., I, p. 119.)

No. 549, ♀. Essex Co. S. Jillson.
No. 108, Illinois. From the Chicago Academy of Sciences, 1864.

Empidonax flaviventris Baird. — Yellow-bellied Flycatcher. Summer resident; and rather more common, I suspect, than most collectors are aware. Its range of habitat, times of migration, and general habits, are much those of *minimus*; and it is difficult to discriminate between the two at gun-shot range. *E. flaviventris* is rather a more wood-loving species than *minimus*, and perhaps breeds farther south, as I have taken it in July, at Washington, D. C., where I never saw *minimus* except during its migrations. (Omitted from *Sam. O. O.*)

TURDIDÆ.

Turdus migratorius Linn. — Robin. Chiefly summer resident, breeding abundantly everywhere; but a few doubtless remain, except in very severe winters, in the more southern portions.

No. 556, ♂. Essex Co. S. Jillson, 1853.
No. 555, ♀. " " " " "
No. 679, ♂. (With an elongated and hooked upper mandible.) Essex Co. H. F. Shepard, Jan., 1868.

Turdus mustelinus Gm. — Wood Thrush. A moderately abundant summer resident in more southern portions; but not apparently extending much farther north than Massachusetts. Still, "common summer resident," Hamilton, C. W., (*McII.*, p. 84.) It is not recorded in Maine lists.

Nos. 550, 551. Essex Co. S. Jillson.

Turdus Pallasii Cab. — Hermit Thrush. Abundant. Spring and autumn migrant through the more southern, and very common summer resident in the northern, portions of New England. "Has been known to breed" (in Mass., *Sam.*, p. 5). "The most common Thrush except the Robin" (Norway, Me., in summer, *Verr.*, p. 10). A few may possibly winter in New England, as individuals are "occasionally seen during the winter;" (Essex Co., Mass., *Putn.*, p. 209.) "Have not found it breeding here;" (Springfield, Mass., *All.*, p. 56.) This is the *T.* "*solitarius*" or *T.* "*minor*" of earlier general and local writers.

No. 562, ♂. Essex Co. S. Jillson.

Turdus fuscescens Steph. — Wilson's Thrush. Tawny Thrush. "Veery." Summer resident, breeding throughout New England, most abundantly in its more southern portions. "It is the most numerous here of all the woodland Thrushes, and the only one that breeds here in abundance, and the only one, excepting *T. mustelinus.*" (Springfield, Mass., *All.*, p. 56.) This is the *T.* "*Wilsonii*" of earlier authors.

Turdus Swainsonii Cab. — Olive-backed Thrush. Chiefly a spring and autumn migrant, though many breed, more especially in the northern portions. I have not seen it recorded as breeding so far south as Massachusetts. Usually quite common. It is a species only recognized of late years, and not given in earlier local lists, either from its absence from the works of Wilson and Audubon, or from confounding it with other species.

No. 553, ♂. Essex Co. S. Jillson.
No. 554. Essex Co. S. Jillson.
No. 112. Chicago, Illinois. R. Kennicott; from the Chicago Academy of Science, 1864.

Turdus Aliciæ Baird. — Gray-cheeked Thrush. Not recorded as having been actually taken in New England, but from its now known range of habitat is undoubtedly to be found there as a spring and autumn migrant, possibly breeding in more northern sections.

A species first introduced by Prof. Baird in 1858, based upon specimens from Illinois. I have since shown that it is a very common Eastern bird, having a range of habitat as extensive as, and nearly identical with, that of *T. Swainsonii*.

Mr. J. A. Allen has attempted to show that this species is not distinct from *T. Swainsonii*. His remarks (pp. 56-7-8) illustrate very fully the well-known seasonal and other variations to which *T. Swainsonii* and *T. fuscescens* are subject; and a citation from Prof. Baird is introduced giving some of the characters of *T. Aliciæ*, with which species Mr. Allen appears to have been autoptically unacquainted at the time of writing.*

No. 111. Chicago, Illinois. R. Kennicott; from the Chicago Academy of Science, 1864.

Harporhynchus rufus Cab.—Brown Thrush. "Thrasher." Abundant summer resident, breeding throughout New England; but not going much farther north.

No. 680, ♂. Salem, Essex Co. Samuel Carlen, summer, 1867.
No. 681, ♀. " " " " " " "

Mimus Carolinensis Gray. — Cat-bird. Common summer resident. Maine appears to be nearly its northern limit in Eastern North America.

No. 566, ♂. Essex Co. T. M. Pond, 1864.
No. 562, ♀. " " " " " "

Mimus polyglottus Boie. — Mocking-bird. Very rare summer resident in more southern portions, being hardly found north of Massachusetts. It is not abundant even in the Middle States.

No. 75. A cage bird, known to have lived thirteen years. C. W. Palfry, 1865.

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* Examine in this connection: *Baird*, B. N. A., 1858, p. 217. — *Id.*, Rev. Amer. Bds., 1864, p. 21. — *Coues*, Pr. A. N. S., Phila., 1861, p. 217. — *Coues* and *Prentiss*, Smiths. Rep. for 1861, p. 405.

SAXICOLIDÆ.

Saxicola œnanthe Bechst. — Stone Chat. A species which occurs as a straggler from Europe, by way of Greenland, to the eastern portions of New England, especially along the coast. Mr. Cassin has recorded it from Nova Scotia, and I found it in Labrador. Long Island, *Lawrence*, Ann. N. Y. Lyc. Nat. Hist., viii, p. 282. (Omitted from *Sam. O. O.*)

Sialia sialis Baird. — Blue-bird. A summer resident, abundantly and generally distributed.

Nos. 365, 366, ♂. Essex Co. S. Jillson, 1853.
No. 367, ♀. " " " " "

MOTACILLIDÆ.

Anthus Ludovicianus Licht.—Tit-lark.—Chiefly spring and autumn migrant. Abundant. Some probably winter in the Connecticut Valley, and a few may possibly breed high up in Maine. By far the greater number, however, go farther north to breed, and farther south to pass the winter.

No. 370. Essex Co. S. Jillson, 1855.

SYLVIIDÆ.

Regulus calendulus Licht. — Ruby-crowned Kinglet. Abundant. Spring and autumn migrant. Possibly some breed. They breed abundantly in Labrador.

No. 361, ♂, adult. Essex Co. S. Jillson.
No. 362, ♀, " " " " "

Regulus satrapus Licht. (*Regulus cristatus* and *R. tricolor* of Linsley, p. 256.) — Golden-crested Kinglet. Common winter resident, except perhaps in the extreme north, where some doubtless breed. Is most abundant, however, in all localities, in spring and fall.

Polioptila cærulea Sclat. — Blue-gray Gnat-catcher. A rare and perhaps accidental summer visitor. "Found in Mass., and as far north as the Canada line." (*Brew.*, quoted by *Peab.*, p. 297.) — "Nova Scotia and Connecticut." (*All.*, p. 83.) (Omitted from *Sam. O. O.*) It is very abundant as far north as the Middle States.

SYLVICOLIDÆ.

Mniotilta varia Vieill. — Black and White Creeper. Common summer resident. The majority, however, go farther north, causing it to be most abundant in spring and fall.

No. 492, ♂, adult, Essex Co. S. Jillson, 1853.
No. 360, ♀, " " " " " "

Parula Americana Bon. — Blue Yellow-backed Warbler. Common summer resident.

No. 502, ♂, adult. Essex Co. S. Jillson, Autumn, 1855.
No. 503, ♂, " " " " " 1853.
No. 504, ♀, " " " " " 1856.

Geothlypis trichas Cab. — Maryland Yellow-throated Warbler. Abundant summer resident. "*Sylvia Rosæ* Aud." (*Peab.*, p. 313), is the young of this species.

No. 491, ♂, Essex Co.
Nos. 523, 364, ♀. Essex Co. S. Jillson, 1855.

Geothlypis Philadelphia Baird. — Mourning Warbler. Rare summer resident. Not often detected farther north than Massachusetts; in which state numerous instances of its capture are recorded. (Waterville, Me.; breeding; July; *Haml.*, p. 3. — Hamilton, C. W., *McIl.*, p. 85.)

Oporornis agilis Baird. — Connecticut Warbler. Of very rare occurrence as a summer visitor, doubtless breeding at least as far north as Massachusetts. (*Emm.*, p. 3; *Peab.*, p. 312; *Putn.*, p. 226; *Sam.*, p. 6; *All.*, p. 82.)

No. 522, ♂, Lynn, Essex Co. S. Jillson, Sept., 1856.
No. 521, ♀, " " " " " " "

Oporornis formosa Baird. — Kentucky Warbler. The occurrence of this species as a rare or casual summer visitor in southern New England is to be confidently anticipated. (Near New York City, *Lawrence*, Ann. Lyc. Nat. Hist., N. Y. viii, 1866, p. 284.) I have found it breeding at Washington, D. C.

Protonotaria citrea Baird. — Prothonotary Warbler. A summer visitor; rare, and perhaps accidental. "Calais, Me., Oct. 30, 1862;" (*Boardm.*, *Verr.*, B. S. N. H., ix, p. 234, only recorded instance). It is properly a bird of the South Atlantic States, and its occurrence in New England must be regarded as exceptional. (Omitted from *Sam O. O.*)

A certain "Orange-throated Warbler, *Sylvia auricollis*" is given as a migratory species of New England by Peabody (p. 309, and *Linsl.*, p. 257). *Auricollis* is one of the old names of the Prothonotary Warbler, and is used by Nuttall (Man. i, 1840, p. 431) for that species. Upon what authority it has been inserted it is not apparent. Prof. Baird has suggested to me that possibly the name was used with reference to the *Dendrœca dominica* (= *superciliosa* or *pensilis* of American writers), but there is no good evidence that the latter, which is a Central American and Southern States species ever straggles as far north as New England. It is, however, given by Linsley (p. 258) upon the authority of Mr. Peabody and Dr. De Kay.

The *Sylvia montana* Wils. has also, I believe, been attributed to New England: but is a species which continues unknown to modern ornithologists.

Icteria viridis Bon. — Yellow-breasted Chat. A very rare summer visitor, not extending much if any north of Massachusetts.

Helmitherus vermivorus Bon. — Worm-eating Warbler. Very rare summer visitant; known to extend north into Maine. (*Verr.*, p. 21.)

Helmitherus Swainsoni Bon. — Swainson's Warbler. Entirely accidental summer visitor. A single instance of its capture in Massachusetts, many years ago, by Dr. S. Cabot, given by Audubon (Orn. Biog. v. p. 462), on the authority of Dr. Brewer, appears to have furnished the sole datum for its recognition as a New England bird by subsequent writers. (*Peab.*, p. 313; *Putn.*, p. 227; *All.*, p. 82.) I myself never saw it even so far north as Washington, D. C., and New England is wholly beyond its proper range of habitat.

Helminthophaga ruficapilla Baird. (*S. rubricapilla* of earlier writers). — Nashville Warbler. Chiefly spring and autumn migrant, but some breed throughout New England. Common.

No 494, ♂. Essex Co. S. Jillson, 1855.

Helminthophaga peregrina Cab. — Tennessee Warbler. Chiefly spring and autumn migrant. Very rare. A few

doubtless breed in the more northern portions. "Head waters of the Penobscot in June." (*Verr.*, p. 21.) Springf. Mass., in May and Sept. (*All.*, p. 61.) It is a species which goes very far north in the interior of America.

Nos. 519, 520. Essex Co. S. Jillson, 1855.

Helminthophaga pina Baird. — Blue-winged Yellow Warbler. Very rare summer visitor to the more southern portions. (Mass. *Emm.*, p. 3; *Cab.*, B. S. N. H., vi, p. 386; *Putn.*, p. 227; *All.*, p. 82; *Sam.*, p. 6.) Not recorded from Maine. "*S. solitaria*" of the earlier writers.

Helminthophaga chrysoptera Baird. — Golden-winged Warbler. Very rare summer visitant to the more southern portions. (Mass., *Cab.*, B. S. N. H., vi, p. 386; *Peab.*, p. 312; *Putn.*, p. 227; *All.*, p. 82; *Sam.*, p. 6.) Not recorded from Maine.

No. 493. Hudson, Mass. S. Jillson, 1862.

Helminthophaga celata Baird. — Orange-crowned Warbler. A very common species of Western North America; but Audubon's statement of its occurrence in Nova Scotia was almost its only eastern record until Mr. Allen detected it near Springfield, Mass. "Very rare; perhaps accidental" (*All.*, p. 61). Near New York City, (*Lawrence*, Ann. Lyc. Nat. Hist., N. Y., viii, p. 284.)

Seiurus aurocapillus Swains. — Golden-crowned Wagtail. "Oven-bird." Abundant summer resident.

No. 489, ♂, adult. Essex Co. S. Jillson, 1855.

Seiurus Novæboracensis Nutt.—Water Wag-tail. Summer resident. Apparently not very abundant. The species has a most extensive breeding range, which includes the greater part of North America. In winter it mostly retires into the Antilles and Central America.

No. 490, adult. Essex Co. S. Jillson, Spring of 1855.

Seiurus Ludovicianus Bon. — Large-billed Water Thrush. Doubtless occurs in summer in the southern portions, although it has never, I believe, been actually detected in New England. (Near New York, *Lawr.*, Ann. N. Y. Lyc. viii, p. 284.) Dr. Prentiss and myself have found it common at Washington, D. C. (Smithsonian Report for 1861, p. 407.)

Dendrœca virens Baird. — Black-throated Green Warbler. Abundant summer resident. Most numerous during its vernal and autumnal migrations in the more southern districts; but I have found it breeding abundantly near Portsmouth, N. H. I believe it prefers pine woods during the breeding season.

No. 488, ♂. Essex Co. S. Jillson, 1855.
No. 497, ♀. " " " " "

Dendrœca cœrulescens Baird. — Black-throated Blue Wood Warbler. *D. Canadensis* of former writers. "*Sylvia sphagnosa* Bon., or *pusilla* Wils." (*Linsl.* p. 257), is the female or young of this species. Summer resident; common; most so during its migrations. Breeds throughout New England; most numerously in its more northern portions.

No. 514, ♂, adult. Essex Co. S. Jillson, Spring of 1855.

Dendrœca coronata Gray. — Yellow-rumped Warbler. "Myrtle-bird." Extremely abundant spring and autumn migrant. A few probably winter in more southern sections. Not known to breed except in northern portions (Calais, Me., G. A. Boardman, *Verr.*, p. 125). The species has been known to occur in Greenland.

No. 506, ♂. Essex Co. S. Jillson, 1855.
No. 507, ♀. " " " " "

Dendrœca Blackburniæ Baird. — Mrs. Blackburn's Warbler. Summer resident; not rare.

The Hemlock Warbler, "*Sylvicola parus* Aud." (*Emm.*, p. 3; *Peab.*, p. 310; *Putn.*, p. 226; *Linsl.*, p. 257, etc.), is the young of this species.

No. 495, ♂. Essex Co. S. Jillson, 1855.
No. 518, ♀. " " " " "

Dendrœca castanea Baird. — Bay-breasted Warbler. Not common. Breeds, at least in more northern sections, but is chiefly seen in spring and fall.

The Autumnal Warbler (*Sylvia autumnalis* Wils., Aud.) of local writers is the young of this species.

No. 515, ♂. Essex Co. S. Jillson, 1855.
No. 485, ♂. " " " " "

Dendrœca pina Baird. — Pine-creeping Warbler. Common summer resident; arriving very early, and re-

maining late. A species whose breeding range is much more extensive than that of most *Dendrœcæ*, and includes Eastern North America from Labrador at least to Georgia.

No. 82, ♀. Lynn, Essex Co. S. Jillson, Autumn of 1855.
No. 510, ♂. " " " " " 1855.
No. 559, ♂. Essex Co. S. Jillson, 1855.

Dendrœca Pennsylvanica Baird. — Chestnut-sided Warbler. Common summer resident. Although most numerous during its migrations, many breed throughout New England.

No. 486, ♂. Essex Co. S. Jillson, 1855.
No. 498, ♀. " " " " "

Dendrœca striata Baird. — Black-poll Warbler. Abundant spring and autumn migrant; some breeding in more northern sections. (Umbagog Lakes, *Verr.*, p. 12; Calais, Me., *Boardm.*, p. 125.) A species whose northern range extends far into arctic America, and the one which passes almost latest of all through the United States on its way north in spring.

No. 496, ♂. Essex Co. S. Jillson, Spring of 1855.
No. 517, ♀. " " " " " " "
No. 509, ♂. " " " " Autumn " "

Dendrœca æstiva Baird. — Golden Warbler. Summer Yellow-bird. Abundant summer resident everywhere. A certain *Sylvia trochilus* Lath., the "yellow" or "willow" wren, which is given by some writers (*Peab.*, p. 312, *Linsl.*, p. 257), can hardly be else than the autumnal or immature plumage of this species; which has also furnished the basis for the *Sylvia Childrenii*, and perhaps, too, the *S. Rathbonicæ* of Audubon's works. The "*Sylvia flava* Lath.," of Linsley, p. 258, cannot be identified. It may be either the Summer Warbler, or *D. palmarum*.

No. 487, ♂. Essex Co. S. Jillson, 1855.
No. 508, ♀. " " " " "

Dendrœca maculosa Baird.—Black and Yellow Warbler. Chiefly spring and autumn migrant; common. But it breeds in Maine, and apparently not rarely (Calais, Me., *Verr.*, p. 234). It goes very far north in the interior of North America.

No. 499, ♂. Essex Co. S. Jillson, 1855.
Nos. 511, 512, ♀ " " " " "

Dendrœca palmarum Baird.—Red-poll Warbler. The *Sylvia petechia* of the earlier American writers (*Peab.*, p. 307, *Linsl.*, p. 256), but by no means the true *petechia*, which is a Jamaican species, closely related to *D. æstiva*. Common spring and autumn migrant, remaining unusually late in the fall, as I have also found to be the case in other localities. It also differs considerably in its habits from most *Dendrœcæ*. A few probably breed in the more northern portions. It goes considerably farther north in summer.

No. 516, ♂. Essex Co. S. Jillson, 1855.

Dendrœca discolor Baird.—Prairie Warbler. Common summer resident as far as Massachusetts, which is about its northern limit.

No. 513, ♂. Essex Co. S. Jillson, 1855.

Dendrœca cærulea Baird.—Blue Warbler. Very rare summer resident. (*Linsl.*, p. 257; *Putn.*, p. 207.) Known to occur as far north as Nova Scotia. It is not ordinarily included in local lists. (Omitted from *Sam. O. O.*)

Perissoglossa tigrina Baird.—Cape May Warbler. Extremely rare summer resident.—("Summer visitant; common; breeds." Calais, Me., *Boardm.*, p. 125. Springfield, Mass., May 13, 1863, *All.*, p. 63; Lynn, Mass., 1847, S. Jillson, *Putn.*, p. 207; E. Windsor Hill, Ct., Dr. W. Wood, *All.*, p. 63; Stratford, Conn., *Lins.*, p. 256.)

For an admirable and succinct synopsis of the Massachusetts Wood-warblers, see *All.*, p. 64; and compare with a summary of those of the District of Columbia, given by Coues and Prentiss (Smithsonian Report, 1861, p. 408.)

Myiodioctes pusillus Bon.—Black-capped Flycatching Warbler. A rather uncommon summer resident; chiefly however seen during its migrations.

No. 501, ♂, adult. Essex Co. S. Jillson, Spring of 1855.

Myiodioctes Canadensis Aud. ("*Sylvia pardalina* Bp." of *Lins.*, p. 256.)—Canada Flycatching Warbler. Common. Chiefly spring and autumn migrant, but many breed, and some as far south as Massachusetts. ("Breeds:

Norway, Me., *Verr.*, p. 12; do. Calais, Me., *Boardm.*, p. 125; do. Lynn, Mass., *Brew.*, B. S. N. H., vi, p. 4; "Mass. in summer;" *Putn.*, p. 206; *Sam.*, p. 7.)

No. 500, ♂. Essex Co. S. Jillson, 1855.
No. 526, ♀. " " " " "

Myiodioctes mitratus Audubon.—Hooded Flycatching Warbler. Very rare, and perhaps accidental summer visitant to more southern portions. (Mass., "Very rare; summer," *Sam.*, p. 7; Conn., *All.*, p. 83; New Haven, Ct., *Linsl.*, p. 257.)

The *Muscicapa* or *Myiodioctes* "*minuta*" has been repeatedly attributed to New England. (Berkshire Co., Mass., *Emmons*, *Peab.*, p. 297; *Putn.*, p. 226; Salem, Mass., Nutt., p. 297; Ipswich, Mass., *Brewer;* Mass., "doubtful" *All.*, p. 83.) I think it probable that some one of the small *Empidonaces* has been mistaken for it. M. "minuta" is rather an apocryphal species, with which latter day ornithologists do not profess to be acquainted.

Setophaga ruticilla Swains.—Redstart. Common summer resident. In southern portions chiefly spring and autumn migrant.

No. 524, ♂. Essex Co. S. Jillson, 1855.
No. 525, ♀. " " " " "

TANAGRIDÆ.

Pyranga rubra Vieill.—Scarlet Tanager. Summer resident, common; less so in more northern portions.

No. 412, ♂. Salem, Essex Co. F. W. Putnam, 1856.
No. 413, ♀. Lynn, " " S. Jillson, June, 1855.

Pyranga æstiva Vieill.—Summer Tanager. Very rare (probably only accidental), as far north as Massachusetts. (Lynn, Mass., April 21, 1852, S. Jillson, *Putn.*, p. 224; *All.*, p. 83. Stratford and New Haven, Ct.; *Linsl.*, p. 261. Omitted from *Sam. O. O.*)

HIRUNDINIDÆ.

Hirundo horreorum Barton.—Barn Swallow. Abundant summer resident.

No. 480, ♂. Lynn, Essex Co. S. Jillson, 1856.
No. 483, ♀. " " " " " "

Petrochelidon lunifrons Cab. — Cliff Swallow. "Eaves Swallow." Abundant summer resident.

Prof. Verrill (B. S. N. H. vol. ix, p. 276, 1863) has recently elucidated some very interesting facts relative to the distribution of this species, substantiating its occurrence in Eastern North America long before the time when it was erroneously supposed to have immigrated from the west. My present belief in the matter is that the Cliff Swallow is, and always has been, amenable to the ordinary laws of migration, and spread over nearly all of North America, the South Atlantic States, perhaps, excepted. The numerous recorded dates of its appearance and breeding in particular localities, merely mark the times when the birds forsook their natural breeding places, and built under eaves, which enabled them to pass the summer where formerly they were unable to breed for want of suitable accommodations.

No. 482, ♂. Lynn, Essex Co. S. Jillson, 1856.
No. 479, ♀. Essex Co. Mr. Houghton, 1848.

Tachycineta bicolor Cab. — White-bellied Swallow. Abundant summer resident.

No. 481, ♀. Lynn, Essex Co. S. Jillson, 1856.

Cotyle riparia Boie. — Bank Swallow. Abundant summer resident.

No. 478. Essex Co. F. W. Putnam, 1854.

Progne subis Baird. — Purple Martin. Common summer resident.

It is very singular that there should be no instances on record of the occurrence in New England of the Rough-winged Swallow, *Stelgidopteryx serripennis*, as the species certainly *ought* to be found there.

AMPELIDÆ.

Ampelis garrulus Linn.—Bohemian Wax-wing. A very rare visitant from the north in winter, and of very irregular occurrence. Accidental in more southern sections. (Mass., *Peab.*, p. 290; *Putn.*, p. 228; *All.*, p. 66; *Sam.*, p. 7. — Conn., Dr. W. Wood, *All.*, p. 66.)

Ampelis cedrorum Baird. — Cedar Wax-wing. "Cedar

Bird." "Cherry Bird." Resident. Abundant. Breeds throughout, and winters in the more southern portions.

No. 475. Essex Co. S. Jillson, 1855.
No. 564, ♀. " " " " "

LANIIDÆ.

Collurio borealis Baird. — Butcher Bird. Great Northern Shrike. Regular winter resident, but not very common south of Maine. None have been known to breed.

No. 468, ♂. Lynn, Essex Co. S. Jillson, Dec., 1855.
No. 469, ♀. Salem, " " B. Grover, Autumn, 1860.
No. 470, ♀. Lynn, " " S. Jillson, Winter, 1855.

Collurio excubitoroides Baird.—White-rumped Shrike. Of very doubtful occurrence. (*Emm.*, p. 3; *Peab.*, p. 292; apparently upon the authority of Nuttall (Man. ii, p. 564), who may have been mistaken. Not given in more recent lists.) New England is beyond its ordinary range. Still the species is found at Hamilton, Canada West ("Summer resident; not very rare." *McIl.*, p. 87), and very likely may occasionally occur.

No. 1170, Hamilton, Canada West, T. McIlwraith, 1866.

Mr. Putnam gives *C. Ludovicianus* in the appendix of his list, misquoting it for "*excubitoroides*," and giving the authority of the above-mentioned writers for its insertion. *Ludovicianus* is entirely a southern species, and I know of no authentic instance of its straggling into New England. I never found it as far north even as Washington, D. C. Mr. Linsley, however, gives it under the name of "*Lanius Carolinensis*," but upon merely opinionative data.

VIREONIDÆ.

Vireo olivaceus Vieill. — Red-eyed Vireo. Abundant summer resident.

No. 471, ♂. Essex Co. S. Jillson, March, 1855.

Vireo gilvus Bon. — Warbling Vireo. Common summer resident.

Vireo Philadelphicus Cass. — Brotherly Love Vireo.*

* As this species has not yet been christened in the vernacular, I beg leave of Mr. Cassin to bestow upon it the above literal translation of its classical appellation.

A very rare summer visitant throughout New England. (Waterville, Me., *Haml.*, p. 4, only recorded instance.) But it is probably of regular though very rare occurrence.

Vireo solitarius Vieill. — Blue-headed Vireo. Rather rare summer resident. Breeds throughout.

No. 473, ♂. Essex Co. S. Jillson, 1855.

Vireo flavifrons Vieill. — Yellow-throated Vireo. Common summer resident, chiefly in more southern sections. (Waterville, Me., *Haml.*, p. 4; not recorded in other Maine lists.)

No. 474, ♂. Essex Co. S. Jillson, March, 1855.

Vireo Novæboracensis Bonap. — White-eyed Vireo. Summer resident, chiefly of more southern sections; and, singularly enough, very rare in or absent from particular localities. Not recorded in Maine lists. "Not known at Springfield, Mass." (*All.*, p. 67. "Rather common:" Essex Co., Mass., *Putn.*, p. 213.)

No. 472, ♂. Essex Co. S. Jillson, March, 1855.

TROGLODYTIDÆ.

Troglodytes aëdon Vieill. — House Wren. — Common summer resident. I do not think it goes much north of New England.

Troglodytes Americanus Aud. — Wood Wren. This is a species recognized by all the local writers, chiefly as a spring and autumn migrant, but probably also breeding. Its relations to *aëdon* are very intimate, and the species is by many authors considered as a dubious one. (Omitted from *Sam. O. O.*)

I have in my private cabinet a specimen taken many years ago near Portsmouth, N. H., which was examined by Mr. Audubon himself, and pronounced to be of this species. It is rather larger and browner, and with less of a light superciliary line than the average of *aëdon;* but looks very like a House Wren.

Anorthura hyemalis Rennie. — Winter Wren. Not abundant. Chiefly winter resident, but also breeds, at least in northern sections. (Calais, Me., *Boardm.*, p. 126.)

Cistothorus palustris Cab. — Marsh Wren. — Summer

resident: not abundant. Chiefly along the coast. It must be very rare north of Massachusetts, as it is not contained in Maine lists, though it is known to occur in Greenland.

Cistothorus stellaris Cab. — Short-billed Marsh Wren. Rather common summer resident as far north at least as Massachusetts. Not recorded from Maine.

Two other wrens, *Thryothorus Bewickii* and *T. Ludovicianus*, may possibly enter the southern portions of New England in summer. Mr. Lawrence (p. 283) records *T. Ludovicianus* from New York Island.

CERTHIIDÆ.

Certhia Americana Bon. — Brown creeper. Common. Breeds throughout New England, and winters in its more southern districts.

No. 263. Essex Co. S. Jillson, 1855.

PARIDÆ.

Sitta Carolinensis Gmelin. — White-bellied Nuthatch. Resident: abundant.

No. 476, ♂. Essex Co. S. Jillson, Autumn, 1854.

Sitta Canadensis Linn. — Red-bellied Nuthatch. Abundant. Resident. Chiefly a winter visitant in more southern, but breeds plentifully in the northern sections.

No. 477, ♀. Essex Co. S. Jillson, 1855.

Lophophanes bicolor Bon. — Crested Tomtit. Rare and perhaps accidental. The only record of its capture that I have found is the mention of it by Linsley (p. 255). Chiefly a more southern species, but has been found north of New England. (Nova Scotia, *Aud.*, Orn. Biog. v, p. 472. — Near New York., *Lawr.*, p. 283. — Omitted from *Sam. O. O.*)

Pœcile atricapillus Bon. — Black-capped Titmouse. Chickadee. Resident. Abundant.

No. 505, ♂. Lynn, Essex Co. S. Jillson, Nov., 1855.

Pœcile Hudsonicus . — Hudsonian Titmouse. Resident in more northern; an occasional or accidental visitor in winter in the southern sections. ("Breeds." Calais,

Me., *Boardm.*, p. 126, *Verr.*, p. 22.—Mass. in winter; *Peab.*, p. 402; *Putn.*, p. 227; *All.*, p. 83.)

ALAUDIDÆ.

Eremophila cornuta Boie.—Shore Lark. Winter resident. Not abundant. Breeds plentifully in Labrador.

No. 368, ♂. Nahant, Essex Co. S. Jillson, Dec., 1855.
No. 369, ♀. " " " " " " "

FRINGILLIDÆ.

Pinicola Canadensis Cab.—Pine Grosbeak. Regular winter visitant, and common in Maine. Farther south it is rare and occasional. (New Haven, Conn., *Linsl.*, p. 261.)

No. 408, ♂. Essex Co. S. Jillson, July, 1855.
No. 403, ♀. " " " " " "

Mr. McIlwraith (p. 88) records the capture of the Evening Grosbeak, *Hesperiphona vespertina* Bon., at Woodstock, Canada.

Carpodacus purpureus Gray.—Purple Finch. Resident, or nearly so. Abundant. Breeds plentifully in more northern portions; and winters more sparingly in the southern.

No. 415, ♂. Essex Co. S. Jillson, Spring, 1855.
No. 418, ♀. " " " " " "

Astragalinus tristis Cabanis.—Goldfinch. Abundant. Breeds plentifully; and remains through the winter, except in the more northern regions.

No. 419, ♂. Essex Co. S. Jillson, Summer, 1855.
No. 420, ♂. " " " " Dec., 1855.

Chrysomitris pinus Bon.—Pine Linnet. Abundant and generally distributed, chiefly as summer resident in more northern, and winter resident in more southern, regions. Known to breed in Massachusetts.

No. 421, ♂. Lynn, Essex Co. S. Jillson, Winter, 1854–5.
No. 109, ♂. Chicago, Ill. R. Kennicott, May. From Chicago Academy of Science, 1864.

Ægiothus linarius Cabanis.—Lesser Redpoll Linnet. Common. Not known to breed. A winter visitant, of irregular occurrence, sometimes appearing in great numbers.

No. 416, ♀. Essex Co. S. Jillson, 1855.

Ægiothus exilipes Coues. — American Mealy Redpoll. Very rare and occasional winter visitant. This is *Linaria* or *Ægiothus "canescens"* of Audubon's works and of the local lists. I do not think the true *canescens*, from Greenland, occurs.

In addition to the preceding it is very probable that my *Ægiothus fuscescens*, from Labrador, occurs in winter.

Curvirostra Americana Wils. — Red Crossbill. Resident, and abundant, though of irregular and uncertain occurrence. Known to breed at least as far south as Massachusetts. ("Said to breed in winter." Calais, Me., *Boardm.*, p. 126.)

No. 407, ♂. Essex Co. S. Jillson, Winter, 1855.
No. 405, ♀. " " " " " "

Curvirostra leucoptera Wils. — White-winged Crossbill. Resident, and common, though less so than the preceding. In southern portions it is chiefly a winter visitant. ("Resident; breeds in winter;" Calais, Me., *Board.*, p. 126.)

No. 410, ♂. Essex Co. S. Jillson, Winter, 1855.
No. 406, ♀. " " " " " "

Plectrophanes nivalis Meyer. — Snow Bunting. Common winter visitant, but rarely remains all summer in New England. (Breeding; Springfield, Mass., summer of 1862. C. W. Bennett, *All.*, p. 70.)

No. 373. Essex Co. Joshua Cleaves, Nov. 18, 1859.
No. 1171, ♂. Salem, Essex Co. S. Carlen, Jan. 1867.
No. 1172, ♀. " " " " " " "
No. 106, adult. Great Slave Lake. From the Chicago Acad., 1864.

Plectrophanes Lapponicus Selby. — Lapland Bunting. Rare winter visitant throughout New England.

No. 372. Essex Co. S. Jillson, 1855.

Chondestes grammacus Swains. — Lark Finch. One instance. Entirely exceptional. (Gloucester, 1845, S. Jillson. *Putn.*, p. 224.)

Passerculus savanna Bon.—Savannah Sparrow. Abundant. Chiefly spring and autumn visitant, but breeds, especially in more northern portions. Probably none winter.

No. 392, ♂. Essex Co. S. Jillson, 1855.

PASSERCULUS "ALAUDINUS" Bon. Western Savannah Sparrow.

I do not think that this supposed species is permanently distinct from the preceding.

No. 104. Great Bear Lake, Arctic America. From the Chicago Academy of Sciences, 1864.

Poœcetes gramineus Baird. — Bay-winged Bunting. Grass Finch. Abundant summer resident.

No. 398, adult. Essex Co. F. W. Putnam, 1856.

Coturniculus passerinus Bon. — Yellow-winged Sparrow. Summer resident. Abundant, becoming less common in more northern sections. ("*Fringilla savannarum?*" *Peab.*, p. 324.)

Coturniculus Henslowii Bon. — Henslow's Sparrow. Summer resident, and very rare; not recorded north of Massachusetts. (Springfield, Mass., *All.*, p. 71. Lynn, Mass., *Sam.*, p. 9. Berlin, Mass., E. S. Wheeler, Proc. B. S. N. H. vii, p. 137.)

Zonotrichia leucophrys Swainson. — White-crowned Sparrow. Chiefly spring and autumn migrant. Not known to breed, though doubtless it does so; and some probably winter. Usually common, but of somewhat irregular occurrence.

No. 107. Chicago, Ill., R. Kennicott, May. From the Chicago Academy of Sciences, 1864.

Zonotrichia albicollis Bon. — White-throated Sparrow. Chiefly spring and autumn migrant, though many breed, especially in more northern sections. Abundant. Few, if any, remain through the winter.

No. 397, ♂. Essex Co. S. Jillson, 1856.

Ammodromus maritimus Swains. — Sea-side Finch. Common summer resident as far north as New Hampshire, where I have found it abundant. Not recorded from Maine. It is chiefly a coast species.

Ammodromus caudacutus Swains. — Sharp-tailed Finch. Distribution much the same as that of the preceding.

Junco hyemalis Sclater. — Snow Bird. Abundant. Resident. Chiefly spring and autumn migrant; but breeds plentifully in Maine. Also breeds, but much more sparingly, towards the southern limits, where some also remain all winter.

No. 422, ♂. Essex Co. S. Jillson, 1858.

Spizella monticola Baird. — Tree Sparrow. Abundant. Chiefly spring and autumn migrant; but breeds, rarely at least, as far south as Massachusetts, where many remain through the winter.

Nos. 394, ♂; 399, ♀. Essex Co. S. Jillson, 1858.
No. 105, Anderson River, north of Great Bear Lake, Arctic America. R. McFarlane. From the Chicago Academy of Sciences, 1864.

Spizella socialis Bon. — Chipping Sparrow. Abundant. Summer resident.

No. 401, ♂. Essex Co. S. Jillson, Spring of 1856.
No. 423, ♀. " " " " Autumn of 1856.

Spizella pusilla Bon. — Field Sparrow. Abundant. Summer resident.

No. 402, ♀. Essex Co. S. Jillson, 1858.

Melospiza melodia Baird. — Song Sparrow. Abundant. Summer resident. I think it will be found to winter in the more southern portions.

No. 391, ♂. Essex Co. S. Jillson, Winter of 1856.
No. 395, ♂. " " " " 1856.

Melospiza palustris Baird. — Swamp Sparrow. Common summer resident. Some probably winter towards the southern limit.

No. 400, ♀. Essex Co. S. Jillson, 1856.

Melospiza Lincolnii Baird. — Lincoln's Sparrow. This is a most extensively distributed species, whose range includes almost the whole continent of North America, and yet it is everywhere of uncommon occurrence. Three instances only of its capture in New England are recorded. (Springfield, Mass., May of 1860, '63, '64. *All.*, p. 73. Omitted from *Sam. O. O.*)

Passerella iliaca Swains. — Fox-colored Finch. Common spring and autumn migrant. Not recorded as either breeding or wintering in New England.

No. 393, ♀. Essex Co. S. Jillson, 1856.
No. 100, Washington, D. C. C. Drexler. From the Chicago Academy of Sciences, 1864.

If the *Passerella obscura* Verrill (Proc. B. S. N. H., ix, 1862, p. 143) be a valid species it undoubtedly visits New England in its migrations.

Pyrgita domestica. — European House Sparrow. Introduced, and at present only found in certain localities,

though it will doubtless before long become generally distributed. All the important circumstances attending the introduction of the species are fortunately on record. See, particularly, *Lawr.*, p. 287; Proc. B. S. N. H., xi, 1867, p. 157, and 1868, p. 389: also "Atlantic Monthly" for 1868.

Euspiza Americana Bon. — Black-throated Bunting. Rare or accidental as far north as Massachusetts, beyond which it is not recorded. ("Mass.," *Nutt.*, i, p. 461; *Emm.*, p. 4; *Peab.*, p. 319; *Putn.*, p. 227; *Sam.*, p. 10; *All.*, p. 84. "New Haven, Conn.; very common;" *Lins.*, p. 261.)

No. 103, ♂. Utah. C. S. McCarthy. From the Chicago Academy of Sciences, 1864.

Guiraca Ludoviciana Swains. — Rose-breasted Grosbeak. Throughout New England in summer. Not abundant, except in particular localities, where it appears to have increased in numbers of late years (*e. g.* Essex Co.; "quite common;" S. Jillson, *Putn.*, p. 212).

No. 411, ♂. Essex Co. S. Jillson, 1856.
No. 409, ♀. " " " " "

Guiraca cærulea Swains. — Blue Grosbeak. Summer visitant; rare or occasional. As far north, at least, as Calais, Me. (*Boardm.*, p. 127. — Omitted from *Sam. O. O.*)

Cyanospiza cyanea Baird. — Indigo Bird. Summer resident. Not abundant much north of Massachusetts.

No. 424, ♂. Essex Co. S. Jillson, 1856.
No. 417, ♀. " " " " "

Cardinalis Virginianus Bp. Cardinal Grosbeak. Rare and accidental as far north as Massachusetts. Perhaps, as suggested by Mr. Linsley, some of the instances of its occurrence may have been cage-birds which had escaped. (See *Nutt.*, Man. i, p. 519. — Connecticut, *Peab.*, p. 329; *All.*, p. 85. — New York Island, *Lawr.*, p. 286. — Omitted from *Sam. O. O.*)

Pipilo erythrophthalmus Vieill. — Towhee Bunting. Summer visitant. Most abundant in more southern portions.

No. 414, ♂. Lynn, Essex Co. S. Jillson, 1855.
No. 557, ♂, young. Lynn, Essex Co. S. Jillson, July, 1855.

ICTERIDÆ.

Dolichonyx oryzivorus Swains. — Bob-o'-link. Abundant summer resident.

No. 453, ♂, Summer. Essex Co. S. Jillson, 1855.
No. 458, ♀, " " " " " "
No. 459, ♂, Winter. " " " " 1856.
No. 455, ♂, Autumn. " " " " "

Molothrus pecoris Swains. (*Fringilla ambigua* Nutt., and of the earlier local authors.) Cow Bird. Common summer resident.

No. 460, ♂. Essex Co. S. Jillson, 1855.
No. 454, ♀. " " " " "

Agelæus phœniceus Vieill. — Red-winged Black-bird. Abundant summer resident.

No. 448, ♂. Essex Co. S. Jillson, 1856.
No. 466, ♀. " " " " "

Sturnella magna Swains. — Field-lark. Resident, but most abundant in summer, as the greater number leave during the winter. "Southern Maine in summer; not common" (*Verr.*, p. 22). Probably does not go much farther north.

No. 461, ♀. Essex Co. S. Jillson, 1856.
No. 98. Peoria, Ill. F. Bischoff. From the Chicago Academy of Sciences, 1864.

Icterus Baltimorensis Daudin. — Baltimore Oriole. "Golden Robin." Abundant summer resident.

No. 446, ♂. Essex Co. S. Jillson, 1855.
No. 447, ♀. " " " " "

Icterus spurius Bon. — Orchard Oriole. Summer resident. Rare; and probably not extending to the northern limits.

Scolecophagus ferrugineus Swains. — Rusty Grackle. Common, chiefly during the migrations; but it breeds in northern sections, and some probably winter.

No. 449, ♂; immature. Lynn, Essex Co. S. Jillson, Sept. 1855.
No. 450, ♂; " " " " " " 1856.

Quiscalus versicolor Vieill. — Purple Grackle. Common summer resident.

No. 451, ♂. Lynn, Essex Co. S. Jillson, Sept., 1855.
No. 452, ♀. " " " " " " "

Quiscalus major Vieill. — Boat-tailed Grackle. En-

tirely accidental, in summer; but has been known to breed. (Cambridge, Mass., *Sam.*, p. 10; *All.*, p. 85.) This is the *Quiscalus* "*baritus*" of Peabody (p. 285), and of Linsley (p. 260; "New Haven; one specimen"). (Omitted from *Sam. O. O.*)

CORVIDÆ.

Corvus carnivorus Bartram. — Raven. Resident, and not uncommon in more northern sections. "Breeds on cliffs at Grand Menan" (*Boardm.*, p. 127). Accidental, or at least unusual towards the southern limits. (Springfield, Mass., 1859; *All.*, p. 75. Quite common on the New Jersey coast, *Lawr.*, p. 289.)

Corvus Americanus Aud. — Crow. Abundant. Resident, except, perhaps, towards the extreme north in the depth of winter.

No. 456, ♀. Beverly, Essex Co. F. W. Putnam, 1863.
No. 457. Essex Co.

Corvus ossifragus Wils. — Fish Crow. A rare summer visitor, chiefly along the more southern portions of the coast.

Cyanura cristata Swains. — Blue Jay. Abundant. Resident. Mostly retires from the extreme north in midwinter.

No. 465, ♀. Essex Co. S. Jillson, 1855.

Perisoreus Canadensis Bon.—Canada Jay. "Whiskey-Jack." Chiefly a winter visitant from the north. Very rare, and only occasional farther south than Maine. Mr. Boardman (p. 127) gives it as resident, and breeding about Calais, Me. (Mass., *Putn.*, p. 228. Not given by Mr. Samuels nor Mr. Allen, as a bird of the State. Near Manhattanville, N. Y. Island, in midsummer, *Lawr.*, p. 289.)

COLUMBIDÆ.

Ectopistes migratorius Swains.—Wild Pigeon. Common. Exceedingly abundant at irregular intervals. Breeds. Not known to winter.

No. 528, ♂. Essex Co. S. Jillson.

Zenædura Carolinensis Bon. — Dove. Summer resident. Common in more southern, rare in the northern regions.

No. 527, ♂. Essex Co. S. Jillson, 1855.

TETRAONIDÆ.

Tetrao Canadensis Linn.—Spruce Partridge. Resident, if not abundant, in more northern sections. Uncommon, as far south as Massachusetts. "A common resident near the Umbagog Lakes" (*Verr.*, p. 17). "Resident. Common. Breeds" (Calais, Me., *Boardm.*, p. 128). "Hemlock woods of Gloucester, Sept., 1851" (S. Jillson, quoted by *Putn.*, p. 224, and *All.*, p. 85). Not given by Samuels as a Massachusetts bird.

No. 864, ♀. Maine. S. Jillson, 1855.
No. 866, ♂. " " " "
No. 865, ♂. " R. Brookhouse, Feb., 1856.

Bonasa umbella Steph. — Ruffed Grouse. Common. Resident.

This is the "Partridge" of New England, but known as the "Pheasant" farther south, where the *Ortyx Virginianus* is known as the Partridge. The latter is the "Quail" of New Englanders.

No. 871, ♂. Essex Co.
Nos. 868-69-70, ♀. Essex Co.

Cupidonia cupido Baird.—Pinnated Grouse. "Prairie Hen." This species is still known to reside in certain localities in New England, though much less numerous than formerly, and doubtless destined shortly to become extinct. (Long Island, Martha's Vineyard, Naushon, etc.) Mr. Peabody (p. 355) says they were "once very common in New England," but that "the only place where they are now (1839) found in Massachusetts is in Martha's Vineyard, and one small island near it." Mr. Allen says (p. 85), "nearly extinct in Massachusetts. A few are still occasional visitors in the south-eastern part of the State, from Long Island, where they still remain." Mr. Samuels says (p. 11), "only found on Martha's Vineyard and Naushon." Not recorded farther north. (Examine also: *Emm.*, p. 4; *Lins.*, p. 264; *Putn.*, p. 229;

Nutt., Man. p.; *Aud.*, Orn. Biog., ii, p. 490; *Aud.*, B. Am., v, p. 93; *Cabot*, Proc. B. S. N. H., v, p. 154.)

Nos. 861, 867, ♂. Illinois. Dr. William Mack, Aug., 1845.
No. 862, ♀. Illinois. N. Vickary, May, 1860.

PEDIŒCETES COLUMBIANUS Elliot. — Sharp-tailed Grouse. (*P. phasianellus* Baird, nec Linn.)

No. 863, ♂. Winter. Boston Market. Probably from Illinois. S. Jillson, Jan., 1856.

CENTROCERCUS UROPHASIANUS Swains. — Sage Cock. Cock of the Plains.

No. 95. Colorado Mts., west of Denver City. D. Thompson. From the Chicago Academy of Sciences, 1864.

The Wild Turkey, formerly abundant, is now generally believed to be nearly or quite extinct. As long ago as 1839, Mr. Peabody tells us, it had become very rare. At the present day it is given by some Massachusetts authorities, and not by others. Mr. Allen "can find no authentic instance of its recent capture in this State, although it has been said to occur wild on Mts. Tom and Holyoke." As Mr. Allen judiciously hints, we must take care not to confound the domesticated Turkey run wild with the true *M. gallopavo*. The former may always be recognized by the conspicuous whitish tips of the feathers of the rump and upper-tail coverts, which are like those of the *M. Mexicana* Gould. Mr. Samuels omits the species. Mr. Putnam gives it, but entirely upon the authority of the older writers. It is contained in none of the Maine lists. Mr. Linsley wrote of it in 1843, "the last Wild Turkey that I have known in Connecticut was taken . . . *about thirty years since*, on Letoket Mountain, in Northford."

PERDICIDÆ.

Ortyx Virginiana Bon. — Quail. — Resident, as far north as Massachusetts. Not very abundant, and apparently rapidly becoming less numerous. Not recorded in the Maine lists.

No. 858, ♂. Essex Co.
No. 857, ♀. " "

Lophortyx Californicus Bon. — California Plumed

Quail. Of exceptional and entirely accidental occurrence, and not really entitled to a place in the list, as the specimens captured were doubtless cage-birds. ("Bridgeport, Ct., Dec., 1840"; *Lins.*, p. 264.)

LAGOPIDÆ.

Lagopus albus Aud. — White Ptarmigan. Rare, in winter, in more northern portions. Hardly known as a straggler so far south as Massachusetts. ("Northern Maine, in winter; rare;" *Verr.*, p. 22. — Omitted from *Sam. O. O.*)

No. 860. White plumage. Manchester, Essex Co., May 10, 1859; but supposed to have been brought alive from Labrador or Newfoundland and escaped.

No. 76, ♀. Summer plumage, Sukkertoppen, Greenland, July 30, 1862. From the Williams College Lyceum, 1864.

No. 94. White plumage. Great Slave Lake. R. Kennicott. From the Chicago Academy of Sciences, 1864.

I am not confident that these three specimens are of the same species; or that *albus* is their proper name.

GRUIDÆ.

GRUS CANADENSIS Temm. — Sand-hill Crane.

Nos. 1034; 1035. Bloomington, Ill. Dr. E. S. L. Richardson.

The Whooping Crane, *G. Americanus*, has been attributed to New England by one author. (*Emm.*, p. 5; and quoted by *Putn.*, p. 229.) No recent writers present it. Its occurrence must be regarded as extremely problematical.

ARDEIDÆ.

Ardea herodias Linn. — Great Blue Heron. "Blue Crane." Summer resident. Common.

No. 996, ♂. Essex Co. J. Webster, 1856.

No. 997, ♂, young. Essex Co.

No. 464, ♀. Newburyport, Essex Co.

Herodias egretta Gray. — Great White Egret. Rare summer visitant; hardly farther north than Massachusetts. No part of New England is within its regular range; and its occurrence must be considered accidental,

though recorded in several instances. (*E. g. Putn.*, p. 218; *All.*, p. 76. — Omitted from *Sam. O. O.*)

Garzetta candidissima Bon. — Snowy Heron, or Little White Egret. Stragglers only as far north as Massachusetts. "Spring: very rare" (Essex Co., Mass., *Putn.*, p. 218). "Boston, 1862"; (*All.*, p. 86.)

Florida cærulea Baird. — Little Blue Heron. Accidental as far north as Massachusetts. "Very rare. Summer visitor." (*Sam.*, p. 11.) "Stragglers taken." (*All.*, p. 86. — Omitted from *Sam. O. O.*)

Ardetta exilis Gray. — Least Bittern. Very rare in summer, as far as Southern Maine. (*Verr.*, p. 22.)

No. 88. Chicago, Ill. H. O. Snow. From Chicago Acad. Sci., 1864.

Botaurus lentiginosus Steph. — Bittern. Common summer resident throughout New England. This is one of the few Herons found as far north as Labrador.

No. 999. Essex Co. R. Brookhouse, 1856.
No. 1000. " "

Butorides virescens Bon. — Green Heron. Common summer resident throughout New England.

No. 1021. Essex Co.
No. 1022, young. Essex Co.

Nyctiardea Gardenii Baird. — Night Heron. "Quabird." "Squawk." Very abundant summer resident. There are extensive "heronries" of this species at Wenham and Rowley, and also at Camden, Mass., though fast becoming things of the past.

No. 998, young; first plumage. Rowley, Essex Co. H. P. Ives, 1854.
No. 993. Essex Co.
No. 994. Salem, Essex Co. L. J. Johnson, April 16, 1852.
No. 995. " " " B. S. Grover, 1854.
No. 396, ♀, young. Essex Co. Amos Prince, May 30, 1866.

The Yellow-crowned Night Heron, *Nyctherodius violaceus*, may also occur. The Louisiana Heron, *Demiegretta Ludoviciana*, has been detected as far north as New York (*Lawr.*, p. 292), and may occasionally straggle into New England, though I know of no record of its occurrence.

Falcinellus Ordii Bon. — Glossy Ibis. Has been occasionally taken as far north as Massachusetts, but its appearance must be regarded as exceptional. (*Emm.*, p. 5; *Peab.*, p. 365; *Lins.*, p. 266; *Putn.*, p. 230; *All.*,

p. 86; *Cabot*, B. S. N. H., iii, pp. 313, 333, 355; iv, p. 346; *Nutt.*, Man. ii, p. 88; *Lawr.*, p. 292. — Omitted from *Sam. O. O.*)

IBIS RUBRA Vieill. — Scarlet Ibis. Nos. 990, 991, from Brazil. The claims of this species to a place in the Fauna of the United States rest upon insufficient evidence.

The White Ibis (*I. alba*) sometimes strays along the coast to New York (*Lawr.*, p. 292), and may reach New England.

CHARADRIIDÆ.

Charadrius Virginicus Borck.—Golden Plover. Spring and autumn migrant. Abundant.

No. 1014, young. Essex Co.
No. 1015. Cape Cod, Mass. S. Jillson, Sept., 1854.

Ægialitis vociferus Cass. — Kildeer Plover. Summer resident; common, but somewhat irregularly distributed.

Ægialitis semipalmatus Cab. — Ring Plover. Spring and autumn migrant. Usually abundant. A few probably breed.

No. 1016. Essex Co. S. Jillson, 1855.
No. 1018. " " " " "

Ægialitis melodus Cab. — Piping Plover. Summer resident. Many breed on the islands and along the coast. Most abundant, however, during its migrations.

No. 1017, ♂. Essex Co. Dr. H. K. Oliver, 1853.

Ægialitis Wilsonius Cass.—Wilson's Plover. Appears to be rather rare, and perhaps only occasional, as far north as Massachusetts. I do not find it recorded from Maine. Dr. Brewer's authority for its abundance at Nahant, in August, 1838, is the one usually quoted. Samuels, however, says (p. 11) "common in spring and fall," which is at variance with the statements of most observers. Recorded from Stratford, Ct. (*Lins.*, p. 265.) The species really belongs to a more southern region.

Squatarola helvetica Cuvier. — Black-bellied Plover. Spring and autumn migrant. Not ordinarily very abundant.

No. 1008. Spring. Essex Co. A. Houghton, 1836.
No. 1010. Fall. " " " " "
No. 1011. Winter. " " " " "
No. 1012, ♂, young. Cape Cod, Mass. S. Jillson, Sept. 1854.

HÆMATOPODIDÆ.

Hæmatopus palliatus Temm. — Oyster Catcher. Of very unusual occurrence, along the coast. (Mass., T. M. Brewer. *Peab.*, p. 358; *Emm.*, p. 5; *Putn.*, p. 230; *All.*, p. 86.)

Strepsilas interpres Illig. — Turnstone. Spring and autumn migrant. Not common.

No. 1019. Essex Co.

No. 1020, ♂, young. Nahant, Essex Co. S. Jillson, Sept. 1855.

RECURVIROSTRIDÆ.

Recurvirostra Americana Gm. — Avoset. Very rare, and perhaps accidental. (Calais, Me., one instance, spring of 1862. *Boardm.*, p. 128; *Verr.*, p. 22. — Mass., *Emm.*, p. 5; *Putn.*, p. 230; *All.*, p. 86.)

Himantopus nigricollis Vieill. — Black-necked Stilt. Very rare and perhaps only accidental. (Calais, Me., spring of 1862, one instance. *Boardm.*, p. 128; *Verr.*, p. 22. — Mass., *Emm.*, p. 5; *Peab.*, p. 358; *Putn.*, p. 230; *All.*, p. 86. — Omitted from *Sam.*, *O. O.*)

The ordinary range of both the preceding species is more southern and western. But Mr. Lawrence (p. 295) has found them near New York.

PHALAROPODIDÆ.

Steganopus Wilsonii Coues. — Wilson's Phalarope. Very rare, perhaps only accidental, and chiefly during its migrations. (*Putn.*, p. 227; *All.*, p. 86, quoting Audubon's authority; *Lawr.*, p. 295; omitted from *Sam.*, *O. O.*)

Phalaropus fulicarius Bon. — Red Phalarope. Rare or occasional along the coast, during its migrations. (*Law.*, p. 295; omitted from *Sam.*, *O. O.*)

Lobipes hyperboreus Cuv. — Northern Phalarope. Not abundant. Chiefly spring and autumn migrant; but Mr. Verrill thinks some may breed off the coast of Maine.

This is probably the species spoken of by Mr. Boardman, as very common in the Bay of Fundy.

No. 1050. Essex Co. S. Jillson, 1856.

SCOLOPACIDÆ.

Scolopax rusticola Linn. — European Woodcock. This species is authenticated as occurring on our coast from Newfoundland to New York, as a straggler from Europe. Examine in this connection *Lawr.*, p. 292, and *Baird*, Am. Journ. Sci. and Art, xli, 1866, p. 25.

Philohela minor Gray. — Woodcock. Abundant summer resident.

No. 1040, ♀. Essex Co.

Gallinago Wilsonii Bon. — Snipe. Common. Chiefly during its migrations; but many breed, especially in the more northern sections.

No. 1044. Essex Co. Dr. H. K. Oliver, December, 1853.

Macrorhamphus griseus Leach. — Red-breasted Snipe. Seen chiefly while migrating; but some breed in the more northern sections. "Summer visitant." (Calais, Me., *Boardm.*, p. 128.)

The *M. scolopaceus* Lawr., is undoubtedly to be added to the list. New York market, March 20th; *Lawr.*, p. 294.

Calidris arenaria Illiger. — Sanderling. Abundant. Chiefly spring and autumn migrant, but perhaps permanent resident. I know that some winter on the New Hampshire coast; and Mr. Verrill (p. 23) gives it as abundant on the Maine coast in summer.

No. 1026. Essex Co.
No. 1027, ♀. Essex Co. R. Waters, August, 1858.

Tringa canutus Linn. — Knot. Ash-colored or Red-breasted Sandpiper. Abundant. Spring and autumn migrant along the coast. Some doubtless winter.

No. 1040. Essex Co. S. Jillson, 1855.
No. 1047, young. Essex Co. S. Jillson, 1855.

Arquatella maritima Baird. — Purple Sandpiper. On the coast in spring, autumn, and winter. Not very uncommon. Not known to breed.

Ancylocheilus subarquatus Kaup. — Curlew Sandpiper. Very rare; seen chiefly during its migrations. The species is in America hardly more, perhaps, than a visitor from Europe.

The four preceding *Tringeæ* are essentially maritime, rarely quitting the immediate vicinity of the sea.

Pelidna Americana Coues. — American Dunlin. Red-backed or black-bellied Sandpiper; (*Tringa alpina* of early writers). Abundant. Chiefly spring and autumn migrant, but some winter.

Actodromas maculata Cass. — Pectoral Sandpiper. "Jacksnipe;" "Grass Snipe;" (*Tringa pectoralis* Say, and early writers). Common during the migrations, particularly in the autumn.

No. 1046, ♀. Essex Co. S. Jillson, 1856.

Actodromas minutilla Coues. — Least Sandpiper. "Peep." Very abundant during its migrations. Chiefly maritime, but very generally distributed.

No. 1025. Essex Co. Dr. H. K. Oliver, 1853.
No. 91. Spanish Town, Jamaica. W. T. March. From the Chicago Academy of Sciences, 1864.

Actodromas Bonapartei Cass. — Bonaparte's Sandpiper. White-rumped Sandpiper. "*Tringa Schinzii*" of earlier authors. A very common and widely distributed species, whose range includes nearly all of North America, at least east of the Rocky Mountains. They are exceedingly abundant in Labrador toward the end of summer; and I have found them equally numerous in Kansas Territory, in May, while migrating northward. They breed in very high latitudes, and are only found in New England, so far as I am aware, during their migrations.

No. 1023. Essex Co. Dr. H. K. Oliver, 1853.
No. 1048. " " S. Jillson, 1855.
No. 1049. " " " " "

Ereunetes pusillus Cass. — Semipalmated Sandpiper. "Peep." Abundant. Spring and autumn migrant. Not known to breed. Some may winter. Chiefly maritime.

No. 1024. Essex Co. Dr. H. K. Oliver, 1853.
No. 90, Spanish Town, Jamaica. W. T. March. From the Chicago Academy of Sciences, 1864.

The Stilt Sandpiper, *Micropalama himantopus*, may be confidently expected to occur; but I cannot refer to any recorded instances of its capture. Mr. Lawrence includes it in his New York list.

The original of *Tringa Cooperii*, Baird, was shot on

Raynor South, L. I., May 24, 1833, and should be included in this list, although I am not aware that any one has seen or heard of any specimens except the type upon which the species was based. Mr. Lawrence gives it a place in his list. Cf. *Baird*, B. N. A., p. 716, and *Coues*, Pr. A. N. S. Philad., 1861, p. 202.

An extralimital species of Sandpiper, *Tringa platyrhyncha*, now *Eurinorhynchus pygmæus*, is inserted by Peabody (p. 367) in the Massachusetts list, on the authority of Mr. S. Cabot, Jr., "who procured a specimen at Nahant." If this instance be authentic, it is the only one on record of the occurrence of the species in North America.

Symphemia semipalmata Hartl. — Willet. Summer resident. Not very abundant.

No. 1039. Essex Co. S. Jillson, 1855.
No. 1040. " " " " "

Gambetta melanoleuca Bon. — Tell-tale. Stone Snipe. Common. Chiefly spring and autumn migrant; but doubtless breeds in more northern portions.

No. 89. Spanish Town, Jamaica. W. T. March. From the Chicago Academy of Sciences, 1864.

Gambetta flavipes Bon.—Yellow-legs. Common spring and autumn migrant. Probably breeds in the more northern portions. (*Verr.*, p. 17.)

No. 1033. Essex Co. Dr. H. K. Oliver. Spring, 1853.
No. 1045. " " S. Jillson. Autumn, 1855.

Rhyacophilus solitarius Baird. — Solitary Sandpiper. Not very abundant. Chiefly spring and autumn migrant. Mr. Samuels (p. 12) gives it as breeding in Massachusetts.

No. 1028, ♀. Essex Co. S. Jillson, October, 1855.

Tringoides macularius Gray. — Spotted Tatler. "Tip-up." "Teeter-tail." Abundant summer resident.

No. 1029, nestling. Essex Co. Dr. H. K. Oliver, 1853.
No. 1031, nestling. Essex Co. S. Jillson, 1855.
No. 1032, young. " " " " "
No. 1030, adult. " " " " "

Actiturus Bartramius Bon.—Bartram's Tatler. "Field Plover." Common. Summer resident; but most abundant during its migrations.

No. 93. Chicago, Ill. R. Kennicott. From the Chicago Academy of Sciences, 1864.

Tryngites rufescens Cab. — Buff-breasted Sandpiper. Very rare spring and autumn migrant.

Philomachus pugnax Gray.—Ruff. Accidental. From Europe. Several instances of its capture at various points on the New England coast. It is now generally included among North American birds. (Calais, Me., "accidental, one or two instances;" Boardman, *Verr.*, p. 23. Near New York; *Lawr.*, p. 294. Long Island; *Baird*, B. N. A., 1858, 727, etc. Omitted from *Sam. O. O.*)

Limosa fedoa Ord.—Marbled Godwit. Not common, and only during its migrations.

No. 1038, ♀. Essex Co.

Limosa Hudsonica Swains. (*Limosa Edwardsii?* of *Linsl.*, p. 267; perhaps an albino.)—Hudsonian Godwit. Rare, and only during its migrations.

No. 1051, ♀, young. Essex Co. S. Jillson, 1855.

Numenius longirostris Wils. — Long-billed Curlew. "Sickle-bill." Not abundant, and only during its migrations.

No. 992. Essex Co. S. Jillson, 1855.

Numenius Hudsonicus Lath. — Hudsonian Curlew. Rare, and only during its migrations.

Numenius borealis Lath.—Esquimaux Curlew. Spring and autumn migrant. It is singular that this species should not be abundant in New England, considering the almost incredible numbers that take their departure for the south from Labrador in early autumn.

In addition to the preceding *Totaninæ*, the *Totanus glottis* Bechst. (*Glottis Floridana* Bp.) has been accredited to Connecticut by Mr. Linsley (p. 266; Stratford; one instance); but very possibly through an erroneous identification.

RALLIDÆ.

Rallus elegans Aud.—Fresh Marsh Hen. Rare, perhaps accidental, in summer, in the more southern portions. (Stratford, Ct. *Linsl.*, p. 267.)

Rallus crepitans Gm.—Salt Marsh Hen. Accidental summer visitor, as far north as Massachusetts. (*Cabot*,

B. S. N. H. iii, p. 326; *Putn.*, p. 229; *Sam.*, p. 12; *All.*, p. 87.)

No. 1006, ♂. Florida. N. C. Robbins, 1854.

Rallus Virginianus Linn.—Virginia Rail. Summer visitant. Not very abundant. Known to breed as far north as Maine.

No. 1009. Ipswich. Essex Co. R. Brookhouse, September, 1858.
No. 1013. Essex Co.

Porzana Carolina Vieill. — Sora Rail. "Ortolan." Common summer resident. Less abundant in more northern portions.

Nos. 1003, 1004. Essex Co. S. Jillson, 1854.
No. 92. Spanish Town, Jamaica. W. T. March. From the Chicago Academy of Sciences, 1864.

Porzana Noveboracensis Cass. — Yellow Rail. Very rare, in summer, as far north as Massachusetts. (*Emm.*, p. 6; *Peab.*, p. 375; *Linsl.*, p. 268; *Putn.*, p. 229; *Sam.*, p. 12; *All.*, p. 87.)

Nos. 1005, 1007. Ipswich. Essex Co. R. Brookhouse, Sept., 1857.

Fulica Americana Gm. — Coot. Summer resident. Not uncommon. Breeds; but appears to be everywhere most numerous during the migrations.

Nos. 1001, 1002, ♂. Essex Co.

Gallinula galeata Bon. — Common Gallinule. Accidental as far north as Massachusetts. (Cambridge, Mass., Cabot. *Peab.*, p. 258; *All.*, p. 87.)

Gallinula martinica Lath. — Purple Gallinule. Very rare and accidental summer visitor. ("Swampscott, Mass., April 22, 1852; S. Jillson;" *Putn.*, p. 224; *All.*, p. 87.) Neither this nor the preceding species is alluded to by Mr. Samuels.

ANATIDÆ.

Cygnus Americanus Sharpless.—Swan. (? *C. "musicus* Bp." *Linsl.*, p. 268.) Of irregular, or at most very rare occurrence, in winter.

Anser hyperboreus Pallas.—Snow Goose. Rare winter visitant along the whole coast.

If the *Anser cœrulescens*, usually believed to be the young of the Snow Goose, be really a valid species, it should take its place in the list of New England birds.

Anser Gambelii Hartl.—American white-fronted Goose. Very rare, and perhaps accidental, in winter. (Omitted from *Sam.*, *O. O.*)

No. 1109. Bloomington, Ill. Dr. E. S. L. Richardson.

Bernicla leucopsis. — Barnacle Goose. This European species has been repeatedly attributed to New England. (Quincy, Mass., *Cab.*, B. S. N. H., iii, p. 136; *Putn.*, p. 225; *All.*, p. 88; Stonington, Conn., *Linsl.*, p. 269.) Its occurrence in North America, a long time considered doubtful, has recently been established. (Am. Nat., ii, 1868, p. 49.)

Bernicla Canadensis Boie. — Wild Goose. Spring and autumn migrant. Abundant.

Bernicla Hutchinsii.—Hutchins' Goose. Chiefly spring and autumn migrant. Not abundant. (Omitted from *Sam.*, *O. O.*)

Bernicla brenta Steph. — Brant. Spring and autumn migrant. Common.

The Black Brant, *Bernicla nigricans* Lawr., is undoubtedly to be found in New England. (Long Island, *Lawr.*, p. 296.)

Anas boschas Linn. — Mallard. Winter resident. Not abundant.

No. 1120, ♂. Essex Co.

Anas obscura Gm. — Black Duck. Resident. Breeds plentifully in more northern portions. One of the most abundant species.

No. 1121, ♂. Essex Co.
No. 1126, ♂. " " S. Jillson, 1855.

Dafila acuta Jenyns.—Pintail Duck. Winter resident, chiefly along the coast. Not abundant.

No. 1129, ♂. Essex Co. S. Jillson, 1855.

Nettion Carolinensis Baird.—Green-winged Teal. Common spring and autumn migrant. Not recorded as breeding.

Nos. 1114, 1135, ♂. Essex Co. S. Jillson, 1856.
No. 1115, ♀. " " " " "

Nettion crecca Kaup. — English Teal. A European species, but so often taken on the coast as to be fairly considered as more than an accidental visitor. (Omitted from *Sam.*, *O. O.*)

Spatula clypeata Boie. — Shoveller. Spring and autumn migrant. Uncommon.

No. 1111, ♂. Essex Co. S. Jillson, 1856.

Querquedula discors Steph. — Blue-winged Teal. Spring and autumn migrant. Common.

No. 1082, ♂. Essex Co.
No. 1118, ♀. " "

Chaulelasmus streperus Gray. — Gadwall. Chiefly in spring and autumn, but some winter. Not abundant.

No. 1130, ♂. Essex Co. S. Jillson, 1855.

Mareca Americana Steph. — Widgeon. Baldpate. Autumn, winter and spring. Common.

No. 1122, ♂. Essex Co. S. Jillson, 1855.
No. 1188, ♂. Chesapeake Bay. R. Brookhouse, 1867.
No. 85. Spanish Town, Jamaica. W. T. March. From the Chicago Academy of Sciences, 1864.

Mareca Penelope Bon. — European Widgeon. A European species, like *N. crecca*, so often taken on our coast as to properly be entitled to a place in our Fauna. (Long Island; apparently breeding; *Brew.*, B. S. N. H., vi, p. 419.) Mr. Samuels says: "Rare in spring and fall" in Massachusetts. Mr. Lawrence has it in his list. (Omitted from *Sam.*, *O. O.*)

Aix sponsa Swains. — Summer Duck. Summer resident. Not very abundant.

No. 1112, ♂; 1183, ♀. Wenham, Essex Co. John J. Gould, 1868.
No. 1113, ♀. Essex Co. S. Jillson, 1855.

Fulix marila Baird. — Scaup Duck. Winter resident, though most plenty during the migrations. Not very abundant.

No. 1083, ♂. Essex Co. S. Jillson, 1855.

Fulix affinis Baird. — Little Blackhead. Chiefly spring and autumn migrant. Some may winter. Uncommon.

No. 86. Spanish Town, Jamaica. W. T. March. From the Chicago Academy of Sciences, 1864.

Fulix collaris Baird. — Ring-necked Duck. Chiefly spring and autumn migrant. Some may winter. Not common. (Omitted from *Sam.*, *O. O.*)

No. 87. Chicago, Ill. Prof. McChenesy. From the Chicago Academy of Sciences, 1864.

Aythya Americana Bon. — Red-head. Winter resident, but more abundant during its migrations.

Aythya vallisneria Bonap. — Canvass Back. Chiefly winter resident. Not abundant.

No. 1185, ♂. Chesapeake Bay. R. Brookhouse, 1867.

Bucephala Americana Baird. Golden-eye. Common winter resident.

No. 1131, ♀. Essex Co. S. Jillson, 1855.

Bucephala Islandica Baird. Barrow's Golden-eye. There can be no doubt that this species, at least occasionally if not regularly, visits the whole of New England. It is recorded from the St. Lawrence, and as far south as New York City. Its only record from New England, so far as I am aware, is Calais, Me., "winter, very rare;" (*Boardm.*, p. 129.) For some interesting notes concerning it, see *Elliot*, Ann. Lyc. N. H. N. Y., vii, Jan., 1862.

Bucephala albeola Baird. — Buffle Head. Butter Ball. Abundant. Winter resident.

No. 1103, ♂. Essex Co. S. Jillson, 1855.
No. 1104, ♀. " " " " "

Histrionicus torquatus Bon. — Harlequin. Rare winter visitant along the coast. Known to breed, rarely, on the islands in the Bay of Fundy (*Boardm.*, p. 130).

Harelda glacialis Leach. — Long-tailed Duck. Common winter resident.

No. 1123, ♂, summer. Essex Co. S. Jillson, 1856.
No. 1080, ♂, winter. " " " " 1855.
No. 1117, ♀, " " " " " "

Camptolæmus Labradorius Gray. — Labrador Duck. Rare winter visitant. (Omitted from *Sam.*, *O. O.*)

Melanetta velvetina Baird. — Velvet Duck. White-winged "Coot." Common winter resident, chiefly along the coast.

No. 1119, ♂. Essex Co. A. F. Bosson.

Pelionetta perspicillata Kaup. — Surf Duck. Abundant winter resident.

No. 1099. Essex Co.

Œdemia Americana Swains. — Scoter. Common winter resident.

No. 1100, ♂. Essex Co.
No. 1116, ♀. " " A. F. Bosson.
No. 291, young. Chesapeake Bay. R. Brookhouse, Nov., 1867.

Somateria mollissima Leach. — Eider Duck. Common on the whole coast during the winter, spring, and autumn. They chiefly retire farther north to breed, though some remain all summer "on the islands of the Bay of Fundy" (*Verr.*, p. 24).

No. 1125, ♂, immature; nearly black all over, with a pure white breast. Essex Co. S. Jillson, 1855.

No. 79, ♀, adult. Sukkertoppen, Greenland, July 30, 1860. From the Williams College Lyceum of Natural History, 1864.

Somateria spectabilis Leach. — King Eider. Rare winter visitant along the coast.

No. 1124, ♀. Essex Co. S. Jillson, 1856.

Erismatura rubida Bon. — Ruddy Duck. Common during its migrations, and many winter. Perhaps some breed in more northern portions.

No. 188. South Salem, Essex Co. Emery S. Johnson, Nov. 7, 1866.

Mergus Americanus Cass. — Sheldrake. Common during the migrations, and in winter. Some may breed?

No. 1084, ♂. Essex Co.
No. 1085, ♀. " "

Mergus serrator Linn. — Red-breasted Merganser. Common during its migrations and in winter. It is said to breed as far south as Massachusetts by Audubon.

No. 1081, ♀. Essex Co.
No. 1184, ♂. Salem, Essex Co. H. B. Griffin, 1867.

Lophodytes cucullatus Reich. — Hooded Merganser. Winter visitant in more southern portions; "a few breed in the northern part;" (of Maine; *Verr.*, p. 24.) Nowhere very common.

No. 1186, ♂. Lake Champlain. Dr. B. Pickman, 1866.
No. 1187, ♀. " " " " " "

The Smew, *Mergellus albellus* Selby, has been inserted in Massachusetts lists, but probably upon erroneous data. Its occurrence in America is very problematical.

SULIDÆ.

Sula bassana Briss. — Gannet. Common. Resident in the northern, winter visitant to the more southern, portions of the New England coast.

No. 1101, ♂, adult. Essex Co. A. Houghton, 1836.
No. 1102, young. " " S. Jillson, Summer, 1856.

Sula fiber Linn. — Booby. "September. Rare." (Es-

sex Co., Mass., *Putn.*, p. 221; Guilford, Conn., *Linsl.*, p. 271.) A species recorded, as above, but by no other writers, so far as I can learn. Its occurrence is entirely exceptional.

PELECANIDÆ.

Pelecanus trachyrhynchus Lath. — American White Pelican. ("*P. erythrorhynchus*" of Gmelin, which name conveys an erroneous impression regarding it, and should be rejected.) Accidental. One instance of its recent capture in New England. (Calais, Me., *Boardm.*, p. 130.) The habitat of this species seems to have changed greatly since the accounts of the earlier authors were penned. New England lies much without its ordinary range as now recognized.

PHALACROCORACIDÆ.

Graculus dilophus Gray. — Double-crested Cormorant. Not uncommon along the coast during the winter.

Graculus carbo Gray. — Common Cormorant. Shag. Common winter visitant along the coast.

No. 1195, immature. Off Gloucester, Essex Co. C. J. Maynard, Jan., 1867.

PHÆTONIDÆ.

Phæton flavirostris Brandt. — Tropic Bird. (*Lepturus candidus* Briss.; *Phæton æthereus*, Audubon, B. Am., vii, p. 64, pl. 427; *P. flavirostris* Brandt, Bull. Acad. St. Petersb. i, 1837, p. 349: Lawrence, B. N. A., 1858, p. 884.) A specimen, No. 1087, agrees with the descriptions and figures here cited, and should undoubtedly bear the above name.

No. 1087. South Atlantic. H. F. Shepard, 1856.

Phæton ———? Another excellent specimen in the collection differs much from the former, and appears to be of a different species. It is much larger, with a bright vermilion bill, and with the back finely mottled with black and white. I do not know the proper name of this species, unless it is the true *æthereus* of Linnæus, as con-

tradistinguished by Brandt and others from *candidus* Briss.

No. 1086, ♂. South Atlantic. H. F. Shepard, 1856.

PROCELLARIIDÆ.

DIOMEDEA EXULANS Linn.—Wandering Albatross. Numerous examples of this species, all from extra-limital localities (No. 1134, and others).

PHŒBETRIA FULIGINOSA Reich. — Dusky Albatross. Several specimens from extra-limital regions.

[NOTE. In addition to the preceding species, I find several examples of *D. culminata* Gould, chiefly from Cape Horn. No. 1127 and others. One of these is peculiarly interesting. The plumage indicates it to be nearly mature; but yet the bill is wholly pure black, with only a slight brownish tinge along the sides of the inferior maxillary ramus. There is not the slightest trace of yellow on the culmen. This is the first example I have ever met with in this condition. The specimen is now in the Smithsonian Institution. This is the species given by Audubon as *D. "chlororhyncha,"* of which he says his specimen was taken not far from the Columbia River.]

Fulmarus glacialis Leach. — Fulmar Petrel. A rare winter visitant along the coast. (*Peab.*, p. 383; *Putn.*, p. 231; *All.*, p. 89. Omitted from *Sam.*, *O. O.*).

DAPTION CAPENSIS Steph. — Pintado Petrel. Of this species, usually accorded a place among North American Birds, a specimen (No. 1142) is in the collection from Cape Horn.

PRIOFINUS CINEREUS Coues. — Cinereous Petrel. (Not the Atlantic "Cinereous Shearwater" which is the *Puffinus Kuhlii* Boie. Not "*Puffinus cinereus*" of the earlier American authors, which is *P. major* Faber, infrà. See my review of the *Procellariidæ*, Pr. A. N. S., Phila., Apr. 1864, p. 119, for synonymes and relationships.) A fine example of this species in the collection (No. 1145) from Cape Horn. It is a very extensively distributed species.

Puffinus major Faber. — Greater Shearwater. "Hagdon." (*Puffinus "cinereus"* of the earlier local lists.) Not uncommon off the coast, particularly in winter. This is the most abundant species off the north-east coast of America. (Omitted from *Sam.*, *O. O.*)

No. 1141. Salem, Essex Co. J. A. Goldthwait, Sept. 25, 1854.

Puffinus Anglorum Temm. — Mank's Shearwater. Of not uncommon occurrence off the coast, chiefly in winter. (Omitted from *Sam.*, *O. O.*)

Puffinus fuliginosus Strickl. — Sooty Shearwater. "Black Hagdon." Common off the coast, except in summer. (Omitted from *Sam.*, *O. O.*)

The whole group of the dusky unicolor Petrels are certainly foremost among the "opprobria ornithologiæ;" remaining a standing rebuke that at this late date so little should be accurately known concerning tham. The question whether this, and certain other birds composing the genus *Nectris* of Forster, as amended by Bonaparte, are valid species, or only seasonal or sexual conditions of the bicolor *Puffini*, is still agitated. There cannot be the slightest doubt that there are species of Petrels remaining uniformly dusky all through their lives; *e. g. P. sphenurus* Gould, *P. carneipes* Gould, *Æstrelata fuliginosa* Coues ex Kuhl, *Majaqueus æquinoctialis* Bon. ex Linn., etc. But that certain of the *Puffini* do not at some period during their progress towards maturity, or afterwards, at some seasons, pass through or acquire a dusky state of plumage, is by no means incontrovertibly proven. For example, I have a strong suspicion that the specimen upon which I based my *Puffinus creatopus* (Pr. A. N. S. Phila., 1864, p. 131), a bicolor individual, was, a few months before its death, in a uniformly fuliginous state of plumage. Argument from analogy is readily forthcoming. Witness the well-known immature states of plumage of *Æstrelata Lessonii*, *Æ. Cookii*, *Æ. mollis*, *Ossifraga gigantea*, *Diomedea exulans*, etc., etc., of the *Procellariidæ;* or, in another family, the species of *Stercorarius;* all of which species pass through, or acquire at times, different plumages, one of which is fuliginous. Let one attempt to study *Procellariidæ*, and he will find, amid a few pretty definitely ascertained facts, an immense mass of heterogeneous, indigestible data, affording ample ground for speculative hypotheses, which are incapable alike of proof or denial, since the key-note whereby they may be harmonized has not as yet been struck.

Procellaria pelagica Linn. — Stormy Petrel. (*Thalassidroma pelagica* Vigors, and most authors.) Of irregular and somewhat rare occurrence off the coast. (Omitted from *Sam.*, *O. O.*)

Oceanites oceanica Coues. — Wilson's Petrel. (*Thalassidroma Wilsonii* of authors.) Common off the coast. I find no recorded instances of its breeding, although most probably it does so. It is a cosmopolitan species.

No. 1138, ♀. Salem Harbor, Essex Co. Capt. B. B. Neal, August, 1855.

Cymochorea leucorrhoa Coues.—Leach's Petrel. (*Thalassidroma Leachii* of authors.) Resident. The most abundant Petrel, being of very common occurrence along the whole coast. "Breeds abundantly from Mount Desert to Grand Menan" (*Verr.*, p. 24). Accidental in the interior. (Springfield, Mass., *All.*, p. 80.)

LARIDÆ.

Buphagus Skua Coues. — Skua Gull. ("*Lestris cataractes*" of authors.) Said to be of very rare or accidental occurrence along the coast as far north as Massachusetts (*Peab.*, p. 381). But it is not given in any of the recent lists, and its occurrence is extremely problematical.

Stercorarius pomarinus Temm. — Pomarine Jäger. Along the coast in winter; not abundant. Known to proceed as far south, at least, as Pennsylvania. It is oftener seen farther north.

Stercorarius parasiticus Gray. — Arctic Jäger. Not rare off the coast in winter. Most numerous in the more northern portions of the continent.

This is the *Lestris Richardsonii* of Audubon, and of the earlier American writers; but not the species or variety so named by Swainson. The true *Richardsonii*, as I have defined it (Pr. A. N. S., Phila., 1863, p. 121), may possibly visit New England in winter.

Stercorarius Buffonii Coues. — Long-tailed Jäger. "Marlingspike." (*S. cepphus* Gray, and authors generally.) Common off the coast in autumn and winter. (Omitted from *Sam.*, *O. O.*)

Larus marinus Linn. — Great Black-backed Gull. "Saddle-back." "Coffin-carrier." Winter visitant. Not abundant. "A few breed." (Bay of Fundy, *Boardm.*, p. 131.)

No. 1095, ♂, adult. Essex Co. S. Jillson, 1856.
No. 1096, ♂, young. " " " " "

Larus glaucus Brünn.—Glaucous Gull. "Burgomaster." "Ice-Gull." Very rare winter visitant. (Omitted from *Sam.*, *O. O.*)

Larus leucopterus Faber.—White-winged Gull. Winter visitant. Not abundant. (Omitted from *Sam.*, *O. O.*)

Larus Smithsonianus Coues.—American Herring Gull. "*L. argentatus*" of American authors. Resident. Abundant in winter along the whole coast. Breeds in numbers on the islands off the coast of Maine.

No. 1094, adult. Essex Co. C. D. Saunders, April, 1854.
No. 1189. Salem Harbor, Essex Co., Dec. 28, 1867. By purchase.

Larus Delawarensis Ord. — Ring-billed Gull. Common off the coast in winter. Some breed. (Omitted from *Sam.*, *O. O.*)

Larus Hutchinsii Richardson. (*Coues*, Pr. Acad. Nat. Sc. Phila., 1862, p. 294.) — Hutchins' Gull. Snow-white Gull. I am much pleased to find in the collection an excellent example of this species of Richardson's, which I have recently revived, as above. The specimen agrees entirely with others in the Smithsonian Institution from various localities, upon which I based the species. The bird is rather smaller than *glaucus*, and pure white all over, including the wings; the shafts of which are yellowish. On the upper tail coverts and scapulars are some very faint, nearly obsolete transverse bars of light grayish brown. On the under tail coverts these bars are somewhat better defined. The plumage of the breast and belly has a slight clouding of grayish, doubtless, with the bars above mentioned, indicative of immaturity. The bill is yellow, its terminal third black. The legs and feet appear to have been dusky flesh-color.

We can avoid recognizing this bird as a valid species upon only two hypotheses. One is, that it is an albino;

but that such is the case is purely a matter of conjecture, and would be an exchange of one doubtful opinion for another. The other is, that it is an immature stage of *L. glaucus*. The color of the bill and some other features tend to confirm this latter supposition. I am somewhat familiar with the "theory of variation" which obtains among Gulls during their progress toward maturity; but do not now recollect an instance in which the bluish pearl of the upper parts of those species, which, like *glaucus*, finally attain this color, is not apparent at an age evidently reached by the specimen in question. Moreover, if such a state of plumage as that just described is a normal stage of *glaucus* during its adolescence, it is rather singular that I should have met with no description of such a condition in my tolerably thorough study of Larine bibliography. For the present, therefore, I continue to give credence to the existence of a large pure white gull, for which I have adopted the above name; being prepared, however, in view of the extreme uncertainty of all matters ornithological, and especially Larine, to retire from my position when the first good evidence of its unsoundness is presented.

No. 1132. Essex Co. S. Jillson, 1856.

[NOTE. The *Larus fuscus* is given by Peabody (p. 380) as found off the coast of Massachusetts, and by Linsley (p. 271) as from Stonington, Conn. These are, doubtless, erroneous identifications. There is no good evidence of the occurrence of this European species on our coasts.]

Chrœcocephalus atricilla Lawr.—Laughing Gull. Resident. Not abundant. "A few breed about the islands." (Bay of Fundy, *Boardm.*, p. 131.) Winters sparingly along southern portions of the coast.

No. 1106, young. Essex Co. S. Jillson, 1856.

Chrœcocephalus Philadelphia Lawr.—Bonaparte's Gull. Common; resident, except perhaps during the breeding season. By no means confined to the coast.

No. 1107, young. Essex Co. S. Jillson, 1853.

Rissa tridactyla Bon. — Kittiwake. Common winter resident. Some probably breed off the coast of Maine.

No. 1105, young ♂, winter. Essex Co. S. Jillson, 1854.
No. 1108, adult. Essex Co. Dr. H. K. Oliver, 1854.

The Fork-tailed Gull, *Xema Sabinii* Leach, doubtless

occurs as a rare winter visitant. (Near New York, *Lawr.*, p. 299.)

Gelochelidon Anglica Bon. — Marsh Tern. (*Sterna aranea* of American authors.) Of rare and perhaps only accidental occurrence, in summer. (*Emm.*, p. 5; *Putn.*, 231; *Sam.*, p. 14; *All.*, p. 90.)

Thalasseus Caspius Boie. — Caspian Tern. A rare winter visitant. "Coast in winter; rare." (Maine, *Verr.*, p. 25.) It is known to go considerably farther south. Mr. Lawrence has it in his New York list.

No. 1194. No locality; a fine example of my var. *imperator*.

Thalasseus acuflavidus Coues. — American Sandwich Tern. Of undoubted occurrence in summer on the coast; although I do not now recall a record of its capture.

Mr. Peabody (p. 378) gives the "*Sterna cayana*" (of Audubon = *regius* Gamb.) as a Massachusetts bird, but entirely upon the statement of Audubon, that he saw it in Labrador. But Audubon doubtless mistook *Caspius* for it. Still I am of opinion that *regius* does sometimes wander as far north as New England. (Near New York, *Lawr.*, p. 299.)

Sterna hirundo Linn. — Common Tern. Summer resident, breeding abundantly along the coast.

No. 1088, young, ♂. Essex Co. Dr. H. K. Oliver, 1853.
No. 1092 (probably) " " " " " " "
No. 1090, 1091, immature. Essex Co. S. Jillson, 1854.
No. 78, fledgling, July 24. Sukkertoppen, Greenland. Williams College Lyceum of Natural History, 1864. Either this or the succeeding species.

Sterna macroura Naum. — Arctic Tern. Abundant. Resident, breeding and wintering.

No. 1089, ♀. Essex Co. C. L. Pierson, 1853.
No. 1093. " " " " " "

Sterna paradisea Brünn. — Roseate Tern. Common on the coast in summer, as far north as Massachusetts. "Breeds plentifully on Muskegat Island, in company with *S. hirundo*, *macroura*, and *Antillarum*." (*All.*, *in epist.*) The species has usually been held to be rare or accidental. (Omitted from *Sam.*, *O. O.*)

Sterna Antillarum Coues. — Least Tern. Summer resident. Common. Some breed.

Sterna Forsterii Nutt. — Forster's Tern. A species which I do not find recorded, though undoubtedly occur-

ring in winter. In the plumage of that season it constitutes Audubon's *Sterna "Havellii."* Mr. Lawrence has specimens from Long Island. It is decidedly a northern species, probably not breeding within our limits.

Hydrochelidon fissipes Gray.—Short-tailed Tern. Rare and perhaps occasional, chiefly in the latter part of summer, and early in autumn.

Haliplana fuliginosa Wagl.—Sooty Tern. A rare and perhaps only accidental summer visitant as far north as Massachusetts. "Breeds on Muskegat Island." (E. A. Samuels, *All.*, p. 90. Omitted from *Sam.*, *O. O.*)

Rhynchops nigra Linn.—Black Skimmer. Entirely accidental, if really occurring. (Mass., *Emm.*, p. 6; *Linsl.*, p. 271; *Putn.*, p. 231; not recognized by other local authorities.)

COLYMBIDÆ.

Colymbus torquatus Brünn.—Loon. Common; resident. "Occasionally breeds." (Mass., *Sam.*, p. 14; *All.*, p. 80.) Regularly breeds in more northern portions. In southern portions is chiefly found during the winter.

No. 1097, adult. Essex Co. S. Jillson, May, 1864.
No. 1098, young. " " " " 1853.

Colymbus arcticus Linn.—Black-throated Loon. Very rare winter resident. Not known to breed. (Omitted from *Sam.*, *O. O.*)

Colymbus septentrionalis Linn.—Red-throated Loon. Rare winter visitant.

No. 80, adult, Sukkertoppen, Greenland, July 30, 1860. Williams College Lyceum of Natural History, 1864.
No. 1190, young. Salem, Essex Co. A. F. Bosson, 1863.
No. 1191, ♀. " " " Saml. Carlen, Nov., 1866.
No. 189, ♂. " " " J. H. Emerton, Nov. 7, 1866.

Colymbus ———? Unidentifiable.

No. 77, nestling. Sukkertoppen, Greenland, July 31, 1860. Williams College Lyceum of Natural History, 1864.

PODICIPIDÆ.

*Podiceps Holböllii** Reinhardt. (*P. rubricollis* or *gri-*

* See my Review of the Loons and Grebes of North America, in the Proc. A. N. S., Phila., 1862, p. 226.

seigena of American writers.)—Red-necked Grebe. Common. Chiefly winter resident, but some doubtless breed.

No. 1147, ♀. Essex Co. William Patterson.
No. 1150. " " A. F. Bosson.

Podiceps cristatus Lath. — Crested Grebe. Common winter resident. Some breed in Maine. (Calais, *Boardm.*, p. 131.)

Podiceps cornutus Lath. — Horned Grebe. Common winter resident. But many breed, particularly in more northern portions.

No. 1148, young ♀. Essex Co. A. F. Bosson.
No. 1149, " " " " " "

Podilymbus podiceps Lawr. — Dabchick. Common; resident, but chiefly occurs in spring and fall.

No. 1444, ♀. Essex Co. R. Brookhouse.

ALCIDÆ.

The Great Auk, *Alca impennis*, formerly existed in New England. For an interesting account of the discovery, by Prof. Wyman, of its remains at Mt. Desert, and at Crouch's Cove, Me., see Am. Nat., i, p. 578. Audubon states that it used to occur on the coast of Massachusetts.*

Utamania torda Leach.—Razor-billed Auk. "Tinker." Chiefly a winter visitant, and common. Resident in more northern portions, breeding about the Bay of Fundy. (*Boardm.*, p. 131; *Verr.*, p. 25.)

No. 83, adult. Labrador. Williams College Lyceum of Natural History, 1864.

Fratercula arctica Ill.—Puffin. "Sea Parrot." Chiefly a winter visitant, and not uncommon. Some breed about the Bay of Fundy. (*Boardm.*, p. 131; *Verr.*, p. 25.)

No. 81. Caribou Isl., Lab. Williams College Lyceum of Natural History, 1864.

The Large-billed Puffin, *F. glacialis*, has been accredited to Grand Menan, by Audubon, and included, upon his authority, in some of the local lists. But its occurrence is at best extremely problematical. (Cf. my mon-

*This statement has been corroborated by the finding of a *humerus* of the Great Auk in the Shell-heaps at Ipswich, by Prof. Baird, in August last.—F. W. P.

ograph of the Alcidæ, p. 24.) Audubon's "glacialis" is the *corniculata* Naum., a North Pacific species, not recorded from the Atlantic.

Lunda cirrhata Pallas. — Tufted Puffin. Said to be of very rare occurrence in winter off the coast of Maine. Near Calais, Me., (*Boardm.*, p. 132; *Verr.*, p. 25. Grand Menan. *Audubon.* Omitted from *Sam.*, *O. O.*)

Uria grylle Lath. — Black Guillemot. "Sea Pigeon." Resident in more northern portions, breeding abundantly on the rocky islands; a common winter visitant along more southern portions of the coast.

No. 1139, ♀, winter. Nahant, Essex Co. S. Jillson, Dec., 1855.
No. 1146, winter. " " " " " "
No. 1140. Essex Co. By purchase, 1864.
No. 82, summer. Labrador. Williams College Lyceum of Natural History, 1864.

Lomvia troille * Brandt. (*Colymbus troille* L. Gm. — *Uria troille* Lath., and most European writers: — *Catarrhactes troille* Bryant. — *Cepphus lomvia* Pallas. — *Uria lomvia* Brünnich; and of Cassin, in Baird's B. N. A., p. 913. — *Uria troile*, Putn., p. 222. Not of Giraud, B. L. I., p. 376. — *Uria lomvia*, Sam., p. 14; Aud., pl. 218, fig. 2. — Not the *Alca lomvia* Linn. – American and European bird considered identical.) — Common winter resident. Some breed, towards the northern portions. ("Murre Ledges," *Boardm.*, p. 131).

Lomvia ringvia Brandt. (*Uria ringvia* Brünnich, and *U. alga* Brünnich; — *leucophthalmus* Faber, *leucopsis* Brehm, *lachrymans* Choris., and some European writers; *troile* of Giraud's Birds of Long Island, p. 376; Audubon's pl. 218, fig. 1.) — This is the species, or variety, with the white ring around, and white line behind, the eye. Winter visitant; probably some breed with the preceding species.

* The three North American species of *Lomvia* have been so often confounded, and their synonymy is in such a state of confusion, that to enable one to know what species is referred to under a given name, it is absolutely necessary to introduce some synonymes. The reader is referred to my Monograph of the Alcidæ, Proceedings of the Philadelphia Academy of Natural Sciences, Jan., 1868, for further information upon the subject. Dr. Bryant's excellent monograph of the genus *Catarrhactes*, in the Proceedings of the Boston Society of Natural History for 1861, should also be consulted.

Lomvia Svarbag Coues.—Brünnich's Guillemot. (*Alca lomvia*, Linn.—*Catarrhactes lomvia* Bryant.—*Uria troille* and *Svarbag*, Brünn. Not *troille* of Linnæus. *Cepphus arra*, Pallas. *Uria arra*, or *Uria Brünnichii* of most authors. Putn., p. 222; Cassin, B. N. A., p. 914. *Uria Francsii* Leach, Giraud, p. 377; Peab., p. 400.)—The thick-billed species, figured by Audubon, pl. 345. Common winter resident. Found as far south as New Jersey. Not known to breed within the limits of New England. (Omitted from *Sam.*, *O. O.*)

Nos. 1143, 1192, winter. Essex Co.

Mergulus alle Vieill.—Sea Dove. "Dovekie." Common winter resident. Not known to breed within the limits of New England.

Nos. 191, 1136, 1137, adults, winter. Essex Co.

ADDENDA.

Strix pratincola Bon.—Barn Owl. This rather southern species has only recently been authenticated as occurring in New England. "The first and only specimen I ever knew taken in New England was killed near Springfield, Mass., about the last of May, of the present year." (J. A. Allen, MS.) Mr. Lawrence includes it in his New York list.

Turdus nævius Gm.—Varied Thrush. This Pacific species has at length been authenticated as a straggler in New England. "A specimen was shot near Boston in December, 1864." (J. A. Allen, MS.) For other instances of its occurrence in the Atlantic States, see *Baird*, B. N. A., pp. xxi, 219; *Cabot*, Proc. B. S. N. H., iii, p. 17; *Allen*, p. 82; *Lawrence*, p. 281.

Mr. Allen informs me that he has carefully examined the specimen of supposed *Turdus nanus*, recorded by Mr. Samuels (Am. Nat., ii, p. 214), and found it to be only an unusually small, bright colored, immature example of *T. Swainsonii!*

Hesperiphona vespertina. Add to the record of this species at Woodstock, Canada, Mr. Lawrence's notice of

its occurrence near New York. Stragglers will probably in time be found in New England.

The Golden Eagle (*Aquila Canadensis*) has been known to breed in Franconia, N. H. (*Dr. Brewer.*)

I am indebted to Mr. Allen for the following memoranda: —

Carpodacus purpureus. — Now not at all rare in southern New England in summer.

Passerculus savanna. — Found breeding plentifully all along the Massachusetts coast; not yet observed in summer in the Connecticut valley.

Coturniculus Henslowii. — Several late instances of its capture in Massachusetts. It seems to be a regular but rare summer visitant. Several nests have been found.

Zonotrichia leucophrys. — Hardly to be considered, Mr. Allen thinks, as "usually common."

Junco hyemalis. — Breeds plentifully in certain localities among the mountains of western Massachusetts.

Spizella monticola.—No authentic instance of its breeding in Massachusetts. The record of its breeding (Proc. B. S. N. H., v, 213,) proves to be erroneous. Mr. Samuels informed Mr. Allen that the nest and eggs there referred to really belonged to *S. socialis.*

Melospiza melodia. — Has been observed in winter at Cambridge, Mass.

M. palustris. — Mr. Allen has not seen this species in Massachusetts except during its migrations.

M. Lincolnii. — Mr. S. Jillson has taken this species at Hudson, in May, 1867.

Cardinalis Virginianus. — Four specimens were taken at one time at Springfield, two or three years since.

Squatarola helvetica. — A few straggling individuals were seen in June on the coast of Massachusetts; but the species is not properly to be considered as a summer resident.

Arquatella maritima. — A few individuals of this species, and also of *Rhyacophilus solitarius*, *Actodromas Bonapartei*, and *A. minutilla*, were seen in June and July

along the coast of Massachusetts; but none of them appeared to be breeding.

Mergus Americanus, *M. serrator*, and *Lophodytes cucullatus*, all breed in Maine as far south as Umbagog Lakes, where eggs and young have been procured. Mr. Allen thinks that Audubon had good grounds for his statement that *M. Americanus* breeds in Massachusetts.

ERRATA.

Page 266, under *Turdus Pallasii*, for No. 562 *read* 552.

Page 273, under *Dendrœca pina*, for No. 82 *read* 1197, and for No. 510, ♂, *read* 510, ♀.

Page 279, under *Certhia Americana*, for No. 263 *read* 363.

Page 284, under *Pipilo erythrophthalmus*, for No. 557 *read* 567.

Page 293, under *Philohela minor*, for No. 1040 *read* 1042.

Page 295, under *Symphemia semipalmata*, for 1040 *read* 1041.

INDEX

OF

FAMILIES AND SPECIES.

[The paging referred to is that given in parenthesis at the *foot* of the page, which is the regular paging of Volume V. of the Proceedings, Essex Institute.]

A.

Accipiter Cooperii, ... 255
fuscus, ... 256
Actiturus Bartramius, . . . 295
Actodromas Bonapartei, . 294, 313
maculata, . . . 294
minutilla, . . 294, 313
Ægialitis melodus, ... 291
semipalmatus, . . . 291
vociferus, ... 291
Wilsonius, . . . 291
Ægiothus canescens, ... 281
exilipes, ... 281
fuscescens, . . . 281
linarius, ... 280
Æstrelata Cookii, ... 304
fuliginosa, ... 304
Lessonii, ... 304
mollis, ... 304
Agelæus phœniceus, ... 285
Aix sponsa, ... 299
Alaudidæ, ... 280
Alca lomvia, ... 311, 312
impennis, ... 310
Alcidæ, ... 310
Ammodromus caudacutus, . . 282
maritimus, . . 282
Ampelidæ, ... 276
Ampelis cedrorum, ... 276
garrulus, ... 276
Anas boschas, ... 298
obscura, ... 298
Anatidæ, ... 297
Ancylocheilus subarquatus, . . 293
Anser cærulescens, ... 297
Gambelii, ... 298
hyperboreus, . . . 297
Anorthura hyemalis, ... 278
Anthus Ludovicianus, . . . 268
Antrostomus vociferus, . . . 263
Aquila Canadensis, . . 258, 313
Archibuteo lagopus, . . . 257, 258
Sancti-Johannis, 257, 258
Ardea herodias, ... 289
Ardeidæ, ... 289
Ardetta exilis, ... 290
Arquatella maritima, . . . 293, 313
Astragalinus tristis, ... 280
Astur atricapillus, ... 255
Athene hypogæa, ... 261
Aythya Americana, ... 299
vallisneria, ... 300

B.

Bernicla brenta, ... 298
Canadensis, ... 298
Hutchinsii, ... 298
leucopsis, ... 298
nigricans, ... 298
Bonasa umbella, ... 287
Botaurus lentiginosus, . . . 290
Brachyotus Cassinii, . . . 259
Bubo Virginianus, ... 260
Bucephala albeola, ... 300
Americana, . . . 300
Islandica, . . . 300
Buphagus Skua, ... 305
Buteo Bairdii, ... 257
borealis, ... 256, 258
elegans, ... 257
Harlanii, ... 257
lineatus, ... 256, 257
montanus, ... 258
Pennsylvanicus, . . . 257
Swainsonii, . . . 257, 258
Butorides virescens, . . . 290

C.

Calidris arenaria, ... 293
Camptolæmus Labradorius, . . 300
Caprimulgidæ, ... 263
Cardinalis Virginianus, . . 284, 313
Carpodacus purpureus, . . 280, 313
Catarrhactes trolle, . . . 311
Cathartes atratus, ... 254
aura, ... 253
Centrocercus urophasianus, . . 288
Centurus Carolinus, . . . 262
Cepphus arra, ... 312
lomvia, . . . 311, 312
Certhia Americana, ... 279
Certhiidæ, ... 279
Ceryle alcyon, ... 263
Chætura pelasgia, ... 263
Charadriidæ, ... 291
Charadrius Virginicus, . . . 291
Chaulelasmus streperus, . . . 299
Chondestes grammacus, . . . 281

Chordeiles popetue, . . . 263
Chrœcephalus atricilla, . . . 307
Philadelphia, . . . 307
Chrysomitris pinus, ... 280
Circus Hudsonicus, ... 258
Cistothorus palustris, . . . 278
stellaris, . . . 279
Coccygus Americanus, . . . 261
erythrophthalmus, . 261
Colaptes auratus, ... 263
Mexicanus, ... 263
Collurio borealis, ... 277
excubitoroides, . . . 277
Ludovicianus, . . . 277
Colopteridæ, ... 264
Columbidæ, ... 286
Colymbidæ, ... 309
Colymbus arcticus, ... 309
septentrionalis, . . 309
torquatus, ... 309
troille, ... 311
Contopus borealis, ... 264
virens, ... 264
Corvidæ, ... 286
Corvus Americanus, ... 286
carnivorus, ... 286
ossifragus, ... 286
Coturniculus Henslowii, . . 282, 313
passerinus, . . 282
Cotyle riparia, ... 276
Cuculidæ, ... 261
Curvirostra Americana, . . . 281
leucoptera, . . . 281
Cupidonia cupido, ... 287
Cyanospiza cyanea, . . . 284
Cyanura cristata, ... 286
Cymochorea leucorrhoa, . . . 305
Cygnus Americanus, ... 297
musicus, ... 297
Cypselidæ, ... 263

D.

Dafila acuta, ... 298
Daption Capensis, ... 303
Demiegretta Ludoviciana, . . 290
Dendrœca æstiva, . . . 273, 274
Blackburniæ, . . 272
Canadensis, . . . 272
castanea, ... 272
cærulea, ... 274
cærulescens, . . 272
coronata, ... 272
discolor, ... 274
dominica, ... 270
maculosa, . . . 273
palmarum, . . 273, 274
Pennsylvanica, . . 273
pensilis, ... 270
pina, ... 272
striata, ... 273
superciliosa, . . 270
virens, ... 272
Diomedea chlororhyncha, . . 303
culminata, . . . 303
exulans, . . 303, 304
Dolichonyx oryzivorus, . . . 285

E.

Ectopistes migratorius, . . . 286
Empidonax Acadicus, . . 264, 265
flaviventris, . . 265
Empidonax minimus . . . 265
Traillii, . . . 265
Eremophila cornuta, ... 280
Ereunetes pusillus, ... 294
Erismatura rubida, ... 301
Eurinorhynchus pygmæus, . . 295
Euspiza Americana, ... 284

F.

Falcinellus Ordii, ... 290
Falco æsalon, ... 255
anatum, ... 254
aurantius, ... 255
buteoides, ... 256
candicans, ... 254, 255
cinereus, ... 255
columbarius, . . . 255, 256
Grœnlandicus, . . . 255
Harlanii, ... 258
hyemalis, . . . 256, 257
Islandicus, ... 254
Labradora, ... 255
nigriceps, ... 254
perigrinus, ... 254
sacer, ... 254, 255
Sancti-Johannis, . . . 257
sparverius, ... 255
temerarius, ... 255
Falconidæ, ... 254
Florida cærulea, ... 290
Fratercula arctica, ... 310
corniculata, . . . 310
glacialis, ... 310
Fringilla ambigua, ... 285
savannarum, . . . 282
Fringillidæ, ... 280
Fulica Americana, ... 297
Fulix affinis, ... 299
collaris, ... 299
marila, ... 299
Fulmarus glacialis, ... 303

G.

Gallinago Wilsonii, ... 293
Gallinula galeata, ... 297
martinica, . . . 297
Gambetta flavipes, ... 295
melanoleuca, . . 295
Garzetta candidissima, . . . 290
Gelochelidon Anglica, . . . 308
Geothlypis Philadelphia, . . . 269
trichas, ... 269
Glottis Floridana, ... 296
Graculus carbo, ... 302
dilophus, ... 302
Gruidæ, ... 289
Grus Americanus, ... 289
Canadensis, ... 289
Guiraca cærulea, ... 284
Ludoviciana, . . . 284

H.

Hæmatopodidæ, ... 292
Hæmatopus palliatus, . . . 292
Halcyonidæ, ... 368
Haliætus leucocephalus, . . . 258
Washingtonii, . . . 259
Haliplana fuliginosa, . . . 309
Harelda glacialis, ... 300
Harporhynchus rufus, . . . 267
Helmitherus Swainsonii, . . . 270

Helmitherus vermivorus, . . . 270
Helminthophaga celata, . . . 271
chrysoptera . 271
peregrina, . . 270
pina, ... 271
ruficapilla, . . 270
Herodias egretta, ... 289
Hesperiphona vespertina, . . 280, 312
Hierofalco, ... 255
Himantopus nigricollis, . . . 292
Hirundinidæ, ... 275
Hirundo horreorum, ... 275
Histrionicus torquatus, . . . 300
Hydrochelidon fissipes, . . . 309
Hylotomus pileatus, ... 262
Hypotriorchis, ... 255

I.

Ibis alba, ... 291
rubra, ... 291
Icteria viridis, ... 270
Icteridæ, ... 285
Icterus Baltimorensis, ... 285
spurius, ... 285

J.

Junco hyemalis, . . . 282, 313

L.

Lagopidæ, ... 289
Lagopus albus, ... 289
Laniidæ, ... 277
Lanius Carolinensis, ... 277
Laridæ, ... 305
Larus argentatus, ... 306
Delawarensis, ... 306
fuscus, ... 307
glaucus, ... 306, 307
Hutchinsii, ... 306
leucopterus, ... 306
marinus, ... 306
Smithsonianus, ... 306
Lepturus candidus, ... 302
Lestris catarractes, ... 305
Richardsonii, ... 305
Limosa Edwardsii, ... 296
fedoa, ... 296
Hudsonica, ... 296
Linaria canescens, ... 281
Lobipes hyperboreus, ... 292
Lomvia ringvia, ... 311
Svarbag, ... 311
troille, ... 311
Lophophanes bicolor, ... 279
Lophodytes cucullatus, . . . 301, 314
Lophortyx Californicus, ... 288
Lunda cirrhata, ... 311

M.

Macrorhamphus griseus, . . . 293
scolopaceus, . . . 293
Majaqueus æquinoctialis, . . . 304
Mareca Americana, ... 299
Penelope, ... 299
Melanerpes erythrocephalus, . . 263
Melanetta velvetina, ... 300
Meleagris gallopavo, ... 288
Mexicana, ... 288
Melospiza Lincolnii, ... 283, 313
melodia, ... 283, 313
palustris, ... 283, 313
Mergellus albellus, ... 301
Mergulus alle, ... 312
Mergus Americanus, . . . 301, 314
serrator, . . . 301, 314
Micropalama himantopus, . . . 294
Milvulus tyrannus, ... 264
Mimus Carolinensis, ... 267
polyglottus, ... 267
Miniotilta varia, ... 269
Molothrus pecoris, ... 285
Motacillidæ, ... 268
Muscicapa minuta, ... 275
Myiarchus crinitus, ... 264
Myiodioctes Canadensis, ... 274
minuta, ... 275
mitratus, ... 275
pusillus, ... 274

N.

Nettion Carolinensis, ... 298
crecca, ... 298
Numenius borealis, ... 296
Hudsonicus, ... 296
longirostris, ... 296
Nyctale Acadica, ... 260
albifrons, ... 260
Richardsonii, ... 260
Nyctea nivea, ... 261
Nycthcrodius violaceus, . . . 290
Nyctiardea Gardenii, ... 290

O.

Oceanites oceanica, ... 305
Œdemia Americana, ... 300
Oporornis agilis, ... 269
formosa, ... 269
Ortyx Virginiana, ... 287, 288
Ossifraga gigantea, ... 304
Otus Wilsonianus, ... 259

P.

Pandion Carolinensis, ... 259
Paridæ, ... 279
Parula Americana, ... 269
Passerculus alaudinus, . . . 281
savanna, . . . 281, 313
Passerella iliaca, ... 283
obscura, ... 283
Pediœcetes Columbianus, . . . 288
phassianellus, . . 288
Pelecanidæ, ... 302
Pelecanus erythrorhynchus, . . 302
trachyrhynchus, . . 302
Pelidna Americana, ... 294
Pelionetta perspicillata, . . . 300
Perdicidæ, ... 288
Perissoglossa tigrina, ... 274
Perisoreus Canadensis, ... 286
Petrochelidon lunifrons, . . . 276
Phæton æthereus, ... 302
flavirostris, ... 302
Phætonidæ, ... 302
Phalacrocoracidæ, ... 302
Phalaropodidæ, ... 292
Phalaropus fulicarius, ... 292
Philohela minor, ... 293
Philomachus pugnax, ... 296
Phœbertia fuliginosa, ... 303
Picidæ, ... 261
Picoides arcticus, ... 262
hirsutus, ... 262

Picus Phillipsii, ... 261
pubescens, ... 262
villosus, ... 261
Pipilo erythrophthalmus, . . . 284
Pinicola Canadensis, ... 280
Plectrophanes Lapponicus, . . . 281
nivalis, ... 281
Podiceps cornutus, ... 310
cristatus, ... 310
griseigena, ... 309
Holbollii, ... 309
rubricollis, ... 309
Podicipidæ, ... 309
Podilymbus podiceps, ... 310
Pœcile atricapillus, ... 279
Hudsonicus, ... 279
Polioptila cærulea, ... 268
Poœcetes gramineus, ... 282
Porzana Carolina, ... 297
Novæboracensis, . . . 297
Priofinus cinereus, ... 303
Procellaria pelagica, ... 305
Procellariidæ, ... 303
Progne subis, ... 276
Protonotaria citrea, ... 269
Puffinus Anglorum, ... 304
carneipes, ... 304
cinereus, ... 303
creatopus, ... 304
fuliginosus, ... 304
Kuhlii, ... 303
major, ... 303
sphenurus, ... 304
Pyranga æstiva, ... 275
rubra, ... 275
Pyrgita domestica, ... 283

Q.

Querquedula discors, ... 299
Quiscalus baritus, ... 286
major, ... 285
versicolor, ... 285

R.

Rallidæ, ... 296
Rallus crepitans, ... 296
elegans, ... 296
Virginianus, ... 297
Recurvirostra Americana, . . . 292
Recurvirostridæ, ... 292
Regulus calendulus, ... 268
cristatus, ... 268
satrapus, ... 268
tricolor, ... 268
Rhyacophilus solitarius, . . 295, 313
Rhynchops nigra, ... 309
Rissa tridactyla, ... 307

S.

Saxicola œnanthe, ... 268
Saxicolidæ, ... 268
Sayornis fuscus, ... 264
Scolecophagus ferrugineus, . . . 285
Scolopacidæ, ... 293
Scolopax rusticola, ... 293
Scops asio, ... 260
Seirurus aurocapillus, ... 271
Ludovicianus, ... 271
Novæboracensis, . . . 271
Setophaga ruticilla, ... 275
Sialia sialis, ... 268
Sitta Canadensis, ... 279
Sitta Carolinensis 279
Somateria mollissima, ... 301
spectabilis, ... 301
Spatula clypeata, ... 299
Sphyrapicus varius, ... 262
Spizella monticola, ... 283, 313
pusilla, ... 283
socialis, ... 283, 313
Squatarola helvetica, . . . 291, 313
Steganopus Wilsonii, ... 292
Stelgidopteryx serripennis, . . . 276
Stercorarius Buffonii, ... 305
cepphus, ... 305
parasiticus, ... 305
pomarinus, . . . 305
Sterna Antillarum, ... 308
Sterna aranea, ... 308
Cayana, ... 308
Forsterii, ... 308
Havellii, ... 309
hirundo, ... 308
macroura, ... 308
Paradisea, ... 308
regius, ... 308
Strepsilas interpres, ... 292
Strigidæ, ... 259
Strix Americana, ... 259
arctica, ... 260
pratincola . . . 259, 312
scandiaca, ... 260
Sturnella magna, ... 285
Sula bassana, ... 301
fiber, ... 301
Sulidæ, ... 301
Surnia ulula, ... 261
Sylvia auricollis, ... 270
autumnalis, ... 272
Childrenii, ... 273
flava, ... 273
montana, ... 270
pardalina, ... 427
petechia, ... 274
pusilla, ... 272
Rathboniæ, ... 273
Roscœ, ... 269
rubricapilla, ... 270
solitaria, ... 271
sphagnosa, ... 272
trochilus, ... 273
Sylvicola parus, ... 272
Sylvicolidæ, ... 269
Sylviidæ, ... 268
Symphemia semipalmata, . . . 295
Syrnium cinereum, ... 260
nebulosum, ... 260

T.

Tachycineta bicolor, ... 276
Tanagridæ, ... 275
Tetrao Canadensis, ... 287
Tetraonidæ, ... 287
Thalasseus acuflavidus, ... 308
Caspius, ... 308
Thalassidroma Leachii, ... 305
pelagica, . . . 305
Wilsonii, . . . 305
Thryothorus Bewickii, ... 279
Thryothorus Ludovicianus, . . . 279
Totanus glottis, ... 296
Tringa alpina, ... 294
canutus, ... 293
Cooperii, ... 294

Tringa pectoralis, ... 294
platyrhyncha, ... 295
Schinzii, ... 294
Tringoides macularius, . . . 295
Trochilidæ, ... 263
Trochilus colubris, ... 263
Troglodytes ædon, ... 278
Americanus, ... 278
Troglodytidæ, ... 278
Tryngites rufescens, ... 296
Turdidæ, ... 265
Turdus Aliciæ, ... 267
fuscescens, . . . 266, 267
migratorius, ... 265
minor, ... 266
mustelinus, ... 266
nævius, ... 312
nanus, ... 312
Pallasii, ... 266
solitarius, ... 266
Swainsonii, . . 266, 267, 312
Wilsonii, ... 266
Tyrannus Carolinensis, ... 264
verticalis, ... 264

U.

Ulula Tengmalmii, ... 260
Uria alga, ... 311
arra, ... 312
Uria Brünnichii, ... 312
Francsii, ... 312
grylle, ... 311
lachrymans, ... 311
leucophthalmus, ... 311
leucopsis, ... 311
lomvia, ... 311
ringvia, ... 311
Svarbag, ... 312
troille, ... 311, 312
Utamania torda, ... 310

V.

Vireo flavifrons, ... 278
Vireonidæ, ... 277
Vireo Novæboracensis, ... 278
olivaceus, ... 277
gilvus, ... 277
solitarius, ... 278
Philadelphicus, ... 277
Vulturidæ, ... 253

Z.

Zenædura Carolinensis, ... 287
Zonotrichia albicollis, ... 282
leucophrys, . . 282, 313

X.

Xema Sabinii, ... 307

REFERENCE TO COMMON NAMES.

Vultures, ... 253–4
Falcons, Hawks, Buzzards and Eagles, ... 254–8
Owls, ... 259–61
Woodpeckers, ... 261–3
Humming Bird, ... 263
Swift, ... 263
Night Hawk and Whippoorwill, . 263
Kingfisher, ... 263
Flycatchers, King Bird, Pewees, etc., ... 264–5
Robin, Thrushes, Cat Bird and Mocking Bird, ... 265–7
Tit Lark, ... 268
Blue Bird and Chat, ... 268
Kinglets, ... 268
Warblers, etc., ... 269–75
Tanagers, ... 275
Swallows, ... 275–6
Wax-wings, ... 276
Shrikes, ... 277
Vireos, ... 277
Wrens, ... 278–9
Nuthatches and Titmice, . . . 279
Lark, ... 280
Grosbeaks, Finches, Linnets, Crossbills, Buntings and Sparrows, ... 280–4
Black Birds, Orioles, Grackles, Cow Bird, Bobolink and Meadow Lark, ... 285
Crows and Jays, ... 286
Pigeons and Doves, ... 286–7
Grouse, ... 287
Quail, ... 288
Ptarmigan, ... 289
Crane, ... 289
Herons and Bitterns, . . . 289–91
Plovers, ... 291
Oyster-catcher and Turnstone, 292
Avoset and Stilt, ... 292
Phalaropes, ... 292
Sandpipers, Snipe, Woodcock and Curlew, ... 293–6
Rails, Marsh Hens, Gallinules, 296–7
Swan, Geese, Ducks, Teal, etc., 297–301
Pelicans, ... 302
Cormorants, ... 302
Tropic Birds, ... 302
Albatros, Petrels and Shearwaters, ... 302–5
Gulls and Terns, ... 305–9
Loons, ... 309
Grebes, ... 310
Auks, Puffins and Guillemots, 310–14
Also see "Addenda," . . . 312–21

NOTES ON THE NATURAL HISTORY OF FORT MACON, N. C., AND VICINITY. (No. 1.)

BY ELLIOTT COUES.

During two years' residence in this locality, I paid some attention to the zoology and botany of the vicinity, and the information obtained may be of some value to others besides myself. The present paper, in which mammals, birds, and reptiles are noticed, may be followed by one or more treating of the fishes, insects, marine invertebrates, and plants.

I. MAMMALS.

Lynx rufus, Raf.

Occasional.

Vulpes virginianus, Rich.

Putorius vison, Gapper.

Lutra canadensis, Sabine.

These three, but especially the mink, are common, and, with the first-named and the following species, represent the fur-bearing animals of the immediate vicinity which are of commercial consequence.

Procyon lotor, Storr.

Syn. *P. lotor* var. *Mexicana*, St. Hilaire, Voy. Venus, I, 1855, p. 25, pl. 6.—*P. Hernandezii*, Wagler, Isis, xxiv, 1831, p. 514.—*P. Hernandezii* var. *Mexicana*, Baird, Mamm. N. A. 1857, p. 212.—*P. nivea*, Gray, Mag. Nat. Hist., I, 1837, p. 580 (Albino).—*P. psora*, Gray, Ann. Mag. N. H. x, 1842, p. 261 (mutilated).—"*Procyon gularis*, Smith, Int. Mamm. Jard. Nat. Lib., xiii, 1842, 222" (fide Baird).

A common animal, in the wooded portions of the vicinity.

Residing for several years in different Southern States, where the Raccoon is either common or very abundant, I became familiar with its variations in size, color, etc., and feel sure that these are as great as those differences held to distinguish a western from the eastern form. Although I do not assign the above synonymy from direct comparison of specimens from the different localities (as I saw none in New Mexico, Arizona, or California), I am confident it is correct, provided *P. Hernandezii*, etc., do not differ from *lotor* in any other points than those given in descriptions of

the authors above quoted. As Mr. Allen[1] holds, and probably has shown, all the features believed to distinguish the western raccoons may be discovered in examination of sufficiently extensive series of eastern ones. Dr. Gray's two species are not different, according to that author's subsequent admission.

Cariacus virginianus, Gray.

Common, almost to be called abundant in wooded portions of the main land near the coast, and said, upon good authority, to occur in the wooded part of the Banks. During the autumn and winter, venison is not much more expensive than beef, a fact attesting the above statements.

? Balæna cisarctica, Cope.

An individual, which I rather suppose than know to be of this species, was taken in May, 1869, off Shackleford. It measured about forty-five feet in total length. The fishermen called it a "right whale." Besides this kind, they spoke of two others, that they occasionally captured, under the names of "Scrag" and "Humpback" (*Agaphilus* sp? and *Megaptera* sp?). They usually take two or three each spring. Remains of whales, as the jaw-bones, shoulder-blades, humeri, and especially vertebræ, are strewn abundantly along the beach.

Delphinus Sp.

At least one species of porpoise is very abundant in and about the harbor, and I think that a second, smaller and darker than the other, is of frequent occurrence. They are to be seen at all times, but are most abundant in spring and fall, during the migration of the fish upon which they prey; and in April and May, during the pairing season, they become especially conspicuous in their amatory gambols. The sexual act is frequently witnessed, and may be recognized at a distance by the reversed position of one of the pair, and the smoothing of the surface of the water by the wasted emissions. The great voracity of the porpoises is evident in their pursuit of schools of fish, some of which are often driven out of the water, only to fall back into the open jaws of the pursuers. The animals are sometimes taken for their oil, in nets made especially for the purpose, but are not

[1] Bull. Mus. Comp. Zool., No. 8, pp. 182–3.

often molested, and usually show entire fearlessness of the nearness of man.

Remains of some cetacean (not a whale), about seventeen feet long, were cast upon the beach during a storm in October last, but identification was impossible, owing to the advanced stage of decay.

Lasiurus cinereus, Allen.

Occasional specimens, in summer.

L. noveboracensis, Gray.

Very abundant in summer, and appearing to live mostly in and about the fort itself, as far as the eastern extremity of the island is concerned; other suitable hiding-places not being in plenty.

Scalops aquaticus, Fischer.

Occasional traces of this animal's presence in the loose soil between the sand-hills and the marsh.

Sciurus carolinensis, Gmelin.

Very abundant in all the wooded vicinity.

Mus decumanus, Pallas.

M. musculus, Linn.

Everywhere about the fort and other settlements.

Fiber zibethicus, Cuvier.

Common.

Lepus sylvaticus, Bach.

One specimen from the neighboring island of Shackleford—the only one I ever saw in the vicinity. I scarcely think that it occurs on Borden, where the next species abounds.

L. palustris, Bach.

The most abundant and characteristic mammal of the island.

I gave some account of this species, in the Proceedings of the Boston Natural History Society for 1869 (p. 89), and have little to add to what there appears, or may be gathered from Audubon's and Bachman's article.

The animal sometimes reproduces in April, more commonly in May, and thence during part of the summer; I do not know whether more than one litter is reared, but think such is the case. The nest is a snug, pretty affair, in a tussock of rank grass or

weeds, or little shrubby patch, in a dry situation. It is sunk a little in the ground, then arched over, with an opening on one side; built of dried grasses, mixed with a few leaves, and warmly lined with the animal's own fur. All those I have seen were so far from water as to be out of reach of any possible rise of the tide.

This appears to be the most distinct of the several species closely related to the foregoing; and is in fact distinguishable on sight, as some of the others are not.

Didelphys virginiana, Shaw.

Syn. *D. californica*, Bennett, P. Z. S., i, 1833, p. 40.—*D. breviceps*, Id., ibid.—*D. pruinosa*, Wagner, Suppl. Schreber, iii, 1843, p. 40.

Abundant in the wooded portions of the vicinity.

Having made this animal a special study, I am in position to offer remarks which cannot be reasonably questioned. Although my investigations were rather anatomical than zoological, I did not neglect the latter portion of the subject. The more specimens I examined, the more I was struck with the variations that depend upon sex and age, as well as those that different individuals corresponding in these conditions present. An examination of these points in the natural history of a single animal, may give results of general application. And yet, in calling attention to the variability of the opossum, I do not wish to be understood as supposing that the animal is not as constant as many or most others; for I believe it to be no exception to a general standard or average in this respect. I doubt that one could study any mammal as closely as I have the opossum, without being similarly impressed. The following paragraphs are mainly confined to consideration of external characters. I can affirm that not one of the characters assigned to the supposed species above cited, is not to be found in specimens of *D. virginiana* from the same locality; that the differences indicate individual peculiarities; and that even upon striking an average of preponderance of certain characters, common to each in various degree, no results will be obtained warranting the separation of the opossums from the southwest as even a geographical race or variety. The assertion is made, it should be understood, upon consideration of descriptions only, without direct comparison of specimens.

Professor Baird remarks (Mex. B. Survey, vol. ii, pt. ii, p. 33), that "although there are some differences in the skulls of the *D.*

virginiana [and of *D. californica*], yet I am unable to establish on them any specific characters. In fact, the variation in the thickness and length of the muzzle in different specimens, in addition to other points, are so great, as readily to convey the impression of many more species than really exist." This is certainly true, and, I think, is speaking within bounds. The author's tables of measurements of skulls of *D. virginiana* show a difference of nearly an inch and a half in total length, in only four specimens; yet this scarcely represents extremes between the largest old males and the smallest young (though full-grown) females. I have skulls before me upon which a person so minded might base very specious *generic* characters. The lateral measurements of the skull are variably proportionate to the longitudinal ones. The muzzle is sometimes tumid, at others regularly conic. Sometimes the interparietal crest forms a high arch, at others is only a direct backward and upward prolongation of the face. This crest may be only a fourth of an inch, or more than half an inch above the expanded surface of the parietals, and when so large it may be partially detached, appearing like an osseous lamina developed in the fascia separating the masseteric muscles. Generally, it is in direct proportion to the size and strength of the individual, and is usually smallest in the female. The zygomatic arch is very variable in amount of outward curvature. The ramus of the lower jaw may be nearly upright, or slope backward so far as to overreach the condyle. It appears to vary with age. The long lower border of the jaw-bone may form a slight regular curve, or a strong irregular one. In two specimens before me, the difference in total length of this bone alone is a full inch, and the smaller of the two is that of the older animal, as shown by the stronger ridges and deeper depressions for muscular attachments, and the much-worn teeth. The difference in length between two canine teeth (both unworn) is a fourth of an inch; the possessors of these were both adult animals. In general, the tusks of the male are longer and stronger than those of the female. It is unnecessary to cite further details. Elimination of all these and other accidental variations shows how very different a skull should be, to furnish specific characters.

The length of the tail, compared with the length of the body, appears to have been relied upon in some instances; but, for several reasons, it is difficult to predicate anything upon this

character. In the first place, it is impossible to always measure the tail from the same point. There is no visible point of separation of tail from body; the latter narrows regularly and gradually into the former, so that we cannot say where one ends and the other begins. Measurement from the end of the fur is usually supposed to be meant; and about where the true fur ends the scaly plates begin. But it will be quite safe to allow for a variation of at least two inches in this regard. I have certainly seen so much difference as this, as well as I could judge. This refers to external measurements of the animal in the flesh; the dried, especially if skinned, tail can afford no data whatever. Finally, appeal to the vertebræ themselves is not infallible, for these may vary. The first coccygeal vertebra (as I hold it to be) resembles the others in physical characters, but is really a part of the sacrum, being anchylosed therewith. At the extremity of the tail, one vertebra or more may be lost without evident trace. The terminal dozen or more bones have no neural canal, nor any noticeable parts beyond the impervious centra by which they articulate; they resemble the internodes of a digit. The tail is singularly liable to ulceration upon injury, when one or more bones may exfoliate from the end, and the subsequent cicatrix be scarcely recognizable.[1] I met with one such case. It would not be safe to base a specific difference upon less than three or four inches in length of tail; and this should be taking age for age of the animal, of course, and be only declared of specimens measured in the flesh. In color, the opossum's tail is usually in largest part whitish or flesh-colored, blotched with a dark livid or blackish hue toward the base. The degree of blotching and the shapes of the dark spaces vary with almost every individual. Sometimes most of the tail is dark colored; sometimes there is almost no pigment in the scales. Absolutely nothing can be predicated of this feature.

The ears of this creature are very thin and membranous, and

[1] It is also highly probable that the coccygeal vertebræ normally vary one or two in number, that is to say, we may find 21, 22, 23 bones, without any having been lost by accident or disease. This, however, is an opinion of mine, not an observation. Some small long-tailed animals vary more than this; *e. g.*, Mr. Allen says (Bull. Mus. Comp. Zool. No. 8, p. 228) that *Hesperomys leucopus* may have from 24–5 to above 30 caudal vertebræ. Other *Muridæ* appear to vary quite as much.

mostly naked, reminding one of the texture of a bat's wing. In color, they are like the tail; usually dark, blotched or rimmed with flesh-color; but they may be wholly blackish or mostly whitish; it is impossible to base any character upon their coloration. The general shape of the conch may be called pyriform (base uppermost) or subcircular; but it is not easy to see what the shape really is, unless the ear is pressed out flat. From their texture, they shrink and shrivel in drying. I have never seen a Virginian opossum with so pointed an ear as "D. californicus" is represented to possess in pl. iii. of the Mexican Boundary Survey; but if, as I presume, the drawing was made from a dried specimen, it is not trustworthy in this point, for indeed the true shape of the ear could have been only guessed at. The ears, like the tail, are peculiarly subject to disease; and may ulcerate away entirely, as I have observed in animals kept in confinement; and this, too, without appreciable general ill-health.

The general body colors are amongst the most variable features. The variation is largely a matter of individual difference; but there are certain things that influence it in a general way; especially age. The opossum grows gray with age, as a rule; half-grown ones seen at a little distance give the impression of a blackish animal; old ones, of a whitish animal. The paws are particularly variable. Generally, they are among the darkest parts, and are often quite blackish; frequently, they are as pale as any other parts. Not to go into tedious particulars in this connection, I may say, in short, that I have seen no points of coloration adduced for *D. californica* that might not be easily matched out of a dozen individuals of the Eastern species, with a single exception. To the best of my recollection, I have not seen a specimen of *Virginiana* with paws completely black to the nails.

Under the circumstances, it seems most probable that a second species of *Didelphys* remains to be determined, if occurring within our limits.

II. BIRDS.

The list is restricted to those species that came under personal observation on the unwooded portion of the island itself, and on the waters of the immediate vicinity; for an exhibit of the strictly littoral and maritime bird fauna, as distinguished from that of

the locality at large, seemed to promise the more of real interest. At the same time it should be remembered, that any of the *Passeres*, &c., of the wooded main land adjoining, not here noted, may occasionally stray into the shrubbery of the sand-bars. The catalogue of the water birds is believed to be pretty full. Aside from these, and excepting a few maritime land birds like the *Ammodrami* for example, the bird-fauna of the locality appears to differ from that of the State at large, mainly in the absence during the breeding season of species that, like the robin and meadow-lark, pass the summer as well as other seasons in higher parts, and perhaps, also, in a rather earlier arrival in spring, and later departure in the fall, on an average, of the migrants.

Turdus migratorius.

Spring and fall, especially March and November; some winter; none observed in summer.

Turdus pallasii.

Spring and fall, occasional, in the shrubbery; spec. in Nov. As elsewhere[1] noted, this species migrates earlier in the spring and later in the fall than its nearest allies; and I have no doubt that it winters in this vicinity.

Turdus aliciæ.

Like the last, but later in coming; specs. in April and May.

Mimus polyglottus.

Resident; common; but not so abundant as it is inland, and especially somewhat further south.

Mimus carolinensis.

Resident; common; but most numerous during the migration.

Anthus ludovicianus.

Abundant, in flocks, from early in November till April.

Thryothorus ludovicianus.

Common; resident; mates in March; nests and lays in April; young obtained May 9.

Telmatodytes palustris.

Abundant, particularly during the migration. It continues in plenty through part of November at least, and I think that some

[1] Coues and Prentiss, Smithsonian Report for 1861, p. 404

may winter here. No nests were observed, and I doubt that any breed in this locality, although it is a common summer bird in Virginia swamps, and I found it breeding in the same latitude (about 35° N.) in the West.

Cistothorus stellaris.

One specimen, October 11, 1869, the only time that I ever saw the bird alive.

Geothlypis trichas.

The most abundant and characteristic of its family, in summer; and I presume, but do not feel sure, that some pass the winter here. They arrive in numbers during the latter part of March and early in April, when many of them have not acquired their full dress. They begin to sing almost immediately, and many nest in April. Young birds may be seen early in May, along with the first broods of the Carolina wren, and from that time until August. The species remains plentiful through part of November.

Parula americana.

Only occasional during the migration (one spec. in September).

Dendroeca coronata.

Very abundant in winter; complementing the yellow-throats at that season. They arrive late in October; become more numerous the following month, and remain until the last of March or early part of April, frequenting the shrubbery in flocks with the savanna sparrows. None were observed to have gained their full plumage before leaving.

Dendroeca discolor.

Arriving late in April, these birds become very numerous in May, when nearly every patch of juniper and clump of bushes has one or more in full song, and continually foraging for winged insects, which they catch in the air with great adroitness. The greater number pass north to breed, but many remain during the summer, especially in thinly wooded sandy tracts of the neighborhood.

Dendroeca striata.

Occasional, in the shrubbery, during the migration.

Dendroeca palmarum.

Rather frequent, particularly late in the fall, in low shrubbery, with the sparrows.

Progne purpurea.

Common, March to October; as many as can find accommodation breed about the fort.

Hirundo horreorum.

During the migration only; then abundant.

Hirundo bicolor.

Abundant during the migration. Numbers made their appearance January 11, 1870, on a warm day, though there had been ice a half inch thick two days before. They almost immediately disappeared during some blustering weather, but reappeared in greater numbers than before on the 20th, and were occasionally seen from that time until the regular migration took place, in April.

Cotyle riparia.

During the migration.

Vireo novæboracensis.

Common summer resident of the shrubbery, April—October.

Vireo olivaceus.

Occasionally seen, during the migration.

Pyranga æstiva.

Frequent, in summer.

Chrysomitris tristis.

Common, in flocks, from November to April. Here it spends much of its time on the ground, feeding apparently in greatest part upon the seeds of *Cenchrus tribuloides*.

Passerculus savanna.

The characteristic sparrow; very abundant everywhere outside the marsh itself, from October to May; none remain through the summer. Its numbers do not perceptibly decrease until the middle of April, when the greater part move northward; but loiterers are seen through most of May. Their earliest connected notes are heard late in March; and they are in full song and

plumage before they leave. Some straggle back in September; more arrive in October, and the full complement appears with the first cold weather of November.

Zonotrichia albicollis.

Only occasional, in winter and during the migrations; although very abundant on the neighboring mainland.

Melospiza melodia.

Common; resident; but most numerous from October to April, as most of them pass northward for the summer.

Melospiza palustris.

Common; resident, I think, as I saw them after May, although I did not observe them through either of the two summers. They seemed most plentiful in November, when many were singing. The ordinary chirp of this species is totally different from that of the last. A timid bird, courting the seclusion of the thick bushes that border the marsh, it forms a sort of connecting link between the two last species that frequent open grassy places and sparse shrubbery, and the two next, that are confined to the marsh itself.

Ammodromus caudacutus.

Living side by side with the next, and with the same general habits and manners, the sharp-tailed finch nevertheless has some obvious peculiarities, as compared with the seaside. As the two species spring up together from the reeds, the sharp-tailed is recognized at a glance by its inferior size, and its general yellowish appearance, closely resembling, in these respects, the *Coturniculus passerinus*, the place of which it appears to fill in the marshes. Seen at the same hasty moment, the seaside looks more like the marsh sparrow; but the general impression received is of a gray, instead of a rufous bird; and its nearest approach, in color, is to the *Poospiza Belli*. The difference in plumage between spring specimens, in full dress, of the sharp-tailed, and the young of the same, in the fall, is striking, and greater than has usually been mentioned; it consists chiefly in the paleness or almost want of the orange-buff that marks the highest condition. There is also a remarkable difference between the two species of *Ammodromus*, in the time of the vernal moult. The seaside finches were all found in full feather, and with highly

developed sexual organs, from the beginning of April; while the sharp-tailed remained in moult through the same month. This, of itself, is a good indication of some notable difference in the time, and probably the places, of breeding. I do not think that any of the sharp-tailed finches breed hereabouts; and it was not until May, when they appeared to be about leaving, that I found any with excited organs, or in perfect plumage. At that date the seasides were mating and nesting, if not already incubating. In the fall, when both species are again together, it is only during a part of the season that they are found in equal numbers. This is during the warm days of October, when they loiter in troops about the bushes around the edges of the marsh, as well as among the reeds. Previously, in September, there are few of the sharp-tailed to be seen; and on entering the marshes in November, the seasides will be found scarce or altogether wanting, while the former are still abundant. These observations, which I made very carefully, are mutually explanatory, and point to the fact that these two species, so closely allied, so often found together, and so commonly spoken of in identical terms, have really a different range of habitat (one being more northerly than the other), migrate independently of each other, moult at separate seasons, and breed more or less apart.

Ammodromus maritimus.

More numerous, on an average, than the last, and more truly characteristic of the locality, as it breeds here in great numbers. In April it retires from the interior of the marsh, to place its nest among the bordering bushes, a little above high-water mark. It begins to sing when mating, and is afterwards, during the incubating, particularly earnest and persevering about it. Each pair usually claims some particular copse, and the male has his favorite singing post, to which he continually resorts. The simple song is something like that of the yellow-winged sparrow, beginning with a few slow notes, then a rapid trill, finally slurred till it sounds like the noise made by some of the grasshoppers. The nest and eggs are now well known. The young in September are somewhat differently streaked from the adults, and appear to constitute Audubon's *A. macgillivrayi.*

The comparison that has been drawn between the actions of the Ammodromi and of Sandpipers seems somewhat forced, and

a more natural one might be traced in the Nuthutches, Titmice, and even Woodpeckers. They climb the reeds with remarkable ease, sliding up and down, skipping from one to another, and hanging in every attitude except head downwards; they are doubtless much aided by the somewhat stiffened tail. On the ground, they are unmistakably sparrow-like, and always proceed by hopping; the flight does not differ noticeably from that of their several near allies. It is irregular and very quick, and they never remain long on wing. They are rather difficult to procure in large numbers, independently of the miry nature of the places they inhabit; as they are not often, comparatively, seen at rest, and it is quite a knack, only acquired by practice, to shoot at them on wing with any certainty of killing. A collector will do well to take a score of them in a morning's walk, even when they are most abundant.

Comparing the Fringillidæ of this seacoast locality with those of inland places of the same latitude, the distinctive features are seen in the *Ammodromi*, and in the great abundance of *Passerculus*, together with the absence or only casual occurrence of several species elsewhere abundant. Thus, I never saw a Chipping Sparrow, Yellow-winged Sparrow, Bay-winged Bunting, or Snow-Bird, on the island.

Pipilo erythrophthalmus.

Common; summer resident, breeding; and just possibly a few spend the winter here, though I do not think I saw any between November and March.

Cardinalis virginianus.

Common; resident; breeds (in May and subsequently).

Icterus spurius.

Moderately common, from the latter part of April, through a portion of September; breeds.

Dolichonyx oryzivorus.

During the migrations only; in spring, not abundant, mostly in early May, when many are in full dress, and singing volubly; in fall, very common, beginning to arrive late in August, and continuing through October.

Agelæus phœniceus.

Resident; abundant. They become more numerous during the

latter part of January, begin to sing in March, get restless in early April, when they come into full feather, but continue in flocks for a week or two longer. The greater number then pass off northward, and those that remain begin to pair. They breed sometimes by the single pair, sometimes in companies with the jackdaws, and have their first eggs early in May; though other batches may be found throughout June and part of July. I estimated that a narrow strip of brushy ground about two miles long contained about a hundred pairs. The young begin to flock about the middle of July; there may have been about a thousand in the tract just mentioned, before they were reinforced, in August, by new-comers from the north.

Sturnella magna.

Very abundant, in flocks, from October to April, when they pass north, or at any rate to higher grounds inland. I saw none breeding, and do not think I ever observed a pair during the summer.

Quiscalus major.

The characteristic species of the family, and very abundant. I judge it to be resident, though it is much less common during December and January, and may move off altogether during the extreme of the season. It does not seem to be authenticated as occurring beyond the Middle States; and, however far north it may occasionally stray in summer, it is essentially a bird of the South Atlantic and Gulf States. It is strictly maritime, and its food differs from that of most of its allies, much as that of the fish-crow does, in comparison with that of *C. americanus*. It feeds on molluscs, aquatic insects, fiddler-crabs, and small fry, which it catches expertly by wading in the water and striking with its bill, in a manner reminding one of a heron. It frequents the muddy flats at low tide, and for similar animal food, and is dispersed through the marsh in gleaning for seeds that form part of its fare. The sexes mingle in flocks, often of large size, up to some time in April, when they break up in pairs, several associating together in the same copse, and placing their nests close together in a sort of rookery, frequented also by the redwings and the green herons. The nests are bulky and inartistic, composed chiefly of interlaced twigs and intertwined grasses, generally with the addition of a few dried leaves as lining or wadding;

I saw none with either mud or horsehair. The laying season is at its height the third or fourth week in April; I did not find more than six, nor fewer than three, eggs in a nest. They measure on an average $1\frac{1}{4}$ by a little over $\frac{3}{4}$ inch; and have the usual shape and curious zigzag markings, on a pale bluish-green ground color. On leaving the nest, the young are curious-looking objects—clear brown above, pale gray or almost white below, with a naked space about the eyes, and fluffy tufts of down on the head. They appear early in June, and by the first of August both old and young are flocking. The young rapidly change after leaving the nest, the brown acquiring a greenish-black cast, the gray of the under parts becoming brown. Both sexes undergo a change in the early fall, after rearing of the young is over, and again in the spring. The moult begins on the head, and progresses backward, the quills and tail-feathers being renewed last. When in perfect plumage, the male is a splendid-looking bird; its large fan-shaped tail, with the lateral feathers placed slantwise, giving it a jaunty air, and serving to steady its flight. A fuller account of this interesting species will be found in the "Ibis," 1870, p. 367.

Corvus ossifragus.

Very common, and resident, though less numerous in summer, and not to my knowledge breeding in the immediate vicinity, probably through lack of suitable woods. They frequent the sea beach, contending with the turkey-buzzards and herring-gulls for the refuse from the fort, and scatter over the marsh, often in company with the last species, feeding upon various animal substances gathered from the shoals and mud-flats, such as shell-fish, fiddler-crabs, and aquatic worms.

Tyrannus pipiri. (*T. carolinensis.*)

Common summer resident, April to September; breeds. This is the only one of the family that appears to regularly visit the island, though four or five species at least are common in the woods of the adjoining land.

Ceryle alcyon.

Occasional, at any season.

Chordeiles virginianus.

Very common, from April to October; breeds, and is especially numerous in August.

Coccygus erythrophthalmus.

Frequent, during the migration.

Colaptes auratus.

Rare or occasional (one specimen taken October 10, 1870).

The *Picus querulus*, although not actually observed on the island, may be here noticed, as one of the characteristic species of the South Atlantic States, and an abundant bird of the pine swamps of the neighboring mainland, where it is resident. It is easily distinguished from our other *Pici* proper, at any reasonable distance; first by its different note, and next by the greater blending of its colors, producing a grayish appearance at a distance where the other species still look definitely black and white. The sexes are exactly alike, except that the ♀ lacks the red over the auriculars, and of the same size; average measurements give $8\frac{1}{2}\times15\times4\frac{1}{2}$; tail $3\frac{1}{2}$.

Falco sparverius.

Frequent; apparently resident.

Accipiter cooperi.

Frequent; apparently resident.

Accipiter fuscus.

Specimen in September.

Circus hudsonius.

Very common; resident.

Pandion haliaëtus.

Common, especially in spring and fall.

Haliaëtus leucocephalus.

Frequently observed at different seasons.

Strix pratincola.

Occasional; specimen taken in the marsh in daylight.

Brachyotus palustris.

Frequent, about the marsh.

Cathartes aura.

Abundant; resident; more numerous in summer than in winter; believed to breed in the neighboring pine swamps.

Cathartes atratus.

This species was observed in summer too frequently to be considered as merely a straggler, though it is far less abundant here than on the coast of the next State southward. Numbers were seen *March* 22d, 1870 (their first appearance that year); and in *November* of the same year I saw many near New Berne, N. C.

Zenædura carolinensis.

Resident; abundant; begins to flock in August, and so continues until April.

Ortyx virginianus.

Casually on the island, which is not entirely suited to its wants; plentiful in the vicinity.

Charadrius virginicus.

Common during the migration, particularly in October and November.

Aegialitis vociferus.

Abundant, especially during the migration, but observed at all seasons, and probably resident, though not known to breed.

Aegialitis semipalmatus.

Aegialitis melodus.

These two species come and go together, and are usually found in company; but the first named much outnumbers the last. They become very plenty in April, and so continue through that month and the next, after which none are to be seen until the latter part of August. In September and October they are again plentiful, and remain in scarcely diminished numbers until cold weather, frequenting all the water-edges with several other small waders. Before leaving in the spring, they come into perfect dress, with very brightly colored bill and feet, and the brilliant ring around the eye. All the colors are duller in the fall, although even at that season adults are easily distinguished from the birds of the year. The two species are easily told apart at any distance by the paleness of *A. melodus*, which closely resembles the winter condition of the sanderling.

Aegialitis wilsonius.

The characteristic species of the family; summer resident; breeding abundantly.

Iris brown; no conspicuous coloring of the edges of the eyelids; bill wholly black; legs pale flesh-color, sometimes with a livid, at others with a yellowish, tint. Shade of the upper parts intermediate between that of *melodus* and of *semipalmatus*; ♂ with a perfect black pectoral collar and bar across the vertex, the nape and cervix strongly tinged with rufous, as in the western species; ♀ with the bars plain grayish-brown, and with little rufous; young, like the female, but duller and grayer. When newly hatched, the down of the upper parts is curiously variegated with brown and black; the under parts are pure white; the bill and feet are as in the adult.

None of these Plovers winter here. They come from the south late in March, with constant increase during April; a part pass further north in May, but many remain to breed. Excepting a few stray sandpipers, they are the only waders of the beach during June and July. Before pairing and resorting to the sand-dunes to breed, they frequent the beach, sand-shoals, mud-flats, and scant-herbaged salt meadows indifferently, in flocks of considerable size, keeping much among themselves; their size, longer legs, and large black bill render them conspicuous among their congeners; they are rather shyer than the rest, and their note is decidedly different. In those opened were found gravel, insects, soft substances apparently both animal and vegetable, and fragments of small molluscs, particularly the fragile young of the *Solen ensis*.

Some account of their nidification, and a description of the eggs, will be found in the *American Naturalist* for September, 1869. This occasion is taken to repeat that the usual number of eggs is three, not four.

Squatarola helvetica.

Abundant during the migration, particularly in October. Here they frequent the water-edges, and the flesh is hardly so good as when they feed over uplands.

Strepsilas interpres.

Very common during the migration, and some probably winter. In May, just before they leave, very perfect specimens may be procured. They begin to return the last of August, and soon become abundant. Many of the old birds at this time retain much of their spring attire, and are thus readily distinguished from the young.

Gallinago wilsonii.

Common during the migration, and often in winter; but are somewhat uncertain. They frequent the marsh, &c.; but rarely, if ever, the more open ground about the harbor.

Macrorhamphus griseus.

Very abundant during the migration, and perhaps some winter, as they may be taken in December. They occur in large flocks on the sand-bars and mud-flats, as well as on the salt meadows; and afford excellent shooting. They are not so common in the spring, and the passage is more rapid.

Pelidna americana.

Very abundant, April and May, and September to November; some may remain all winter. A large part of them attain their perfect dress before leaving in the spring; and it is partly retained by many during the full migration, when, however, most of them are in plain gray plumage. The vernal change begins early in April, soon after the main body arrives from the south. Even in spring they are often found exceedingly fat; and in the fall their corpulence seems only limited by the capacity for expansion of the skin. In examining a great number, I found a variation of a third of an inch in the length of the bill; but this is always considerably over an inch long, and never quite straight. They seem to prefer muddy flats to the beach, and are among the most snipe-like of the sandpipers.

Actodromas bonapartei.

Common, during the migration, associating in flocks with several other species. The larger size, and conspicuously white rump, mark it at once from *Ereunetes*, and the next species, its most frequent companions.

This little species is liable to be found in sandy and muddy places throughout North America, east of the Rocky Mountains. It breeds in Labrador, where, in July and August, it is one of the most abundant shore birds; and in various parts of British America. I found it migrating through Kansas in May.

Actodromas minutilla.

Extremely abundant, April and May, and August to October, both on the beach, in flocks with the next, and also in muddy meadows.

The beach and marsh are cleared of all their sandpipers about the first of June; and, for some six weeks, scarcely a straggler of any sort is to be seen. But about the middle of July—a few days before or after the 15th—a few of this and the next species reappear, and in August the numbers are materially increased, still in advance of the main body of September arrivals. It is an open question about these July birds. It seems improbable that they should have gone so far north as the most southern places where we know of their breeding, and have raised a brood, in the short six weeks of their disappearance. Probably they are either those that left in the van of the spring migration, or those that did not accomplish a complete migration, from whatever cause.

Ereunetes pusillus.

Extremely abundant, as elsewhere along the Atlantic coast, during the migrations; here, chiefly from early April to June, and from August (see above) through October. They show as decided preference for the beach as the least sandpipers do for muddy flats.

Calidris arenaria.

Very abundant at all times, excepting during the three summer months. The greater number pass north early in May, but a few linger until June. Some arrive late in August, and most of them in September. After October they are conspicuous by their light color, appearing almost white at a distance. The vernal change commences in April, but the process is slow, and few completely ruddy birds are seen here. Up to a short time before their departure, they continue in compact flocks; but in May, are more dispersed, and the prospective pairs are seen chasing each other over the sand, the males, puffed up to nearly twice their usual size, going through a variety of odd motions, and piping in excited tones.[1]

[1] In this bird, with no external trace of a hallux, the accessory metatarsal is present, without, however, bearing even a rudimentary phalanx, and without causing any protuberance of the metatarsal envelope. It is a small oval or somewhat reniform ossicle, slightly twisted on itself, and deeply sulcate along the middle, lying in the fossa between the three prongs of the metatarse, where it is ligamentously bound down. It lacks the usual roughened surface of opposition with the principal bone. Independently of morpholo-

Symphemia semipalmata.

Resident, but less common during the colder months; very abundant at other times, and one of the few waders that regularly breed here. Numbers arrive from the south in March and April; a part of them proceed further north, and the rest, in May, scatter over the marshes to breed. In August the ranks are again recruited by the numbers hatched here, and in September by others returning. The large size, variegated color, and restless, noisy disposition combine to render it one of the most notable birds of the vicinity in summer.

Gambetta melanoleuca.

Gambetta flavipes.

Both common during the migration—the first named the more abundant.

Rhyacophilus solitarius.

Only observed in April and May, and September and October, and not abundant.

Tringoides macularius.

Summer resident, arriving late in March, becoming very abundant in April, and the greater number passing north in May; but the young are common in July.

Limosa fedoa.

Abundant during the migrations, particularly in the fall. Possibly some may breed in the vicinity, but I am not sure of this. Some appear in August, many more in September, and they continue plentiful about the harbor until December.

Numenius longirostris.

Resident; abundant during the migrations, and rather common at other times. I observed it in February, and at irregular intervals through the summer, when it is sparingly dispersed over the marshes, in all probability breeding.

Immense flights of curlew sometimes occur in October and

gical considerations, its presence is not readily accounted for; but it seems to be a sort of trochlear ossicle, for the guidance if not the increased action of the flexor tendons. This bone, in a more or less rudimentary condition, may perhaps be discovered in more three-toed birds than are now believed to possess it.

March. Some flocks that I witnessed must have contained thousands of birds. These were not the species just named, but whether *hudsonicus* or *borealis* was not ascertained.

Recurvirostra americana.

I scarcely think that this is a regular, and it certainly is not, according to my observations, a common migrant here. The only time I identified it with certainty, was on the 12th of September, when a flock of six was seen.

Ardea herodias.

A resident species, common on the marshes at all seasons. This and the Bittern are the only species of the family that I observed in winter. I do not know that it breeds in the immediate vicinity, but such is probably the case.

Herodias egretta.

Only observed late in summer, and through autumn, when moderately common, and generally seen in small flocks.

Garzetta candidissima.

Apparently a summer resident, though not observed breeding. I first saw it early in May, when it appeared to be migrating, but individuals were obtained at various times during the summer. They were oftenest in flocks of considerable size. Old birds killed in July still had lengthened plumes on the head and breast, but the former were not recurved, and the dorsal ones were wanting. Except in these respects, the birds of the year were like the adults. They remain until October at least, and probably later.

Butorides virescens.

Summer resident, and very abundant, arriving late in March and early in April, and remaining until October. They breed in colonies with the jackdaws, placing the nests in the thick shrubbery that covers part of this end of the island. The nests are rather large and frail platforms of loosely interlaced twigs, built on dense beds of small branches, or saddled in a crotch, or swung like hammocks upon a mass of climbing vines. The birds begin to lay the second or third week in April, but some do not fill the nest until after the first of May. The complement is usually five or six; but I have found only four, and in one instance *seven*—the latter number probably being the maximum. The old birds

shed their dorsal plumes during the period of incubation; the young, for some time after quitting the nest, show traces of down here and there, particularly about the head.

Botaurus lentiginosus.

I think that the Bittern will prove a resident species here, though I have only observed it from September to May. It is quite common in the fall; thus, I have shot two or three, and seen as many more in an afternoon's walk in October. Singular as it may seem, viewing the abundance of the bird, and its wide distribution over North America, a complete history has not yet appeared. The earlier accounts are defective, and not entirely accurate. Perhaps the best notice we have is Mr. Endicott's, in the *American Naturalist*, iii, p. 169.

Rallus crepitans. (= *R. longirostris*, Bodd.)

This is probably the most abundant, and it is certainly one of the most characteristic birds of the locality. It should properly be classed among the resident species, although its numbers are greatly diminished during December to February, and it may entirely disappear in very cold weather. Its ranks are largely recruited in March, and little or no decrease is perceptible until November. It becomes very noisy in April, and the marshes resound with its harsh cries until the next autumn. The laying season is at its height during the latter part of April, and through a portion of May; but eggs may be procured nearly all summer. A full account of its nidification, with other particulars, will be found in the *American Naturalist*, iii, p. 600. I have nothing to add to what is there given, but I would now increase the number stated as an average nest-complement of eggs, to nine or ten. The largest number found in a nest was twelve, although there is no certainty, in such a case as this, that all were deposited by the same bird.[1]

[1] Embryos about one-half developed, taken May 14, afforded the following tracts of the downy plumage. Pteryla capitis continuous, though weak, and running uninterrupted into prolongation of both spinal and ventral. The strong pt. spinalis commences as a single band on the median line over the coccyx, divides after passing the pelvis into two slightly divaricating bands, that approach but do not join on the cervix, and run uninterrupted to the nape—inclosing a narrowly lanceolate space on the back, and a linear one on the hind neck; but this is very narrow, and would probably

Porzana carolina.

During the migration only, in April, May, and part of August to October; then common.

P. noveboracensis.

One individual observed April 12th, under circumstances that left no doubt of the identification.

The numbers of wild-fowl that throng the sinuosities of the coast in winter are simply incalculable. Immense flocks cover the waters of the harbor; and yet these are said to be inconsiderable compared with those upon the land-bound reaches of water a little removed from the coast. Aside from the natural conditions determining this influx of the Anatidæ, such as congenial latitude, convenient feeding-grounds, and an abundant supply of food, we may attribute a part of the number of water-fowl to the incessant and systematic persecution they suffer somewhat further north. Here they are comparatively free from annoyance, their destruction not being attempted methodically, nor usually with any considerable degree of skill. A few of the species appear in the early fall, but the great flight does not fairly set in until the cold weather of November. The numbers are full the following month, and continue undiminished through the winter. The decrease is

disappear soon, by fusion of the two branches on the upper half of the neck behind. The pt. humeralis is completely isolated by apteriæ from surrounding tracts; it is short but wide and strong, and lies parallel with the spinal. The pt. femoralis is doubled; an inner and outer row of feathers are entirely separate, and both of them are strong. The under or upper band arises over the extremity of the pelvis, and runs with slight obliquity to the front of the knee; the outer arises from the side of the coccyx, and runs parallel with the other along the lower edge of the outer aspect of the thigh to the crus; it is there almost continuous with the ventral tract, and is but slightly separated at its origin from the caudalis; but is as widely separated from the other femoral tract as this last is from the spinal. The pt. cruris is as yet only indicated by a few sparsely distributed follicles, with the feathers beginning to protrude along the anterior and posterior borders; the pt. alaris is in the same condition, and the caudalis but little more advanced. The ventral pteryla is double throughout; its branches are separated from each other on the neck, by as much space as they are from the spinal tract; and rather abruptly divaricate on the breast, inclosing a broad oval space, finally approaching gradually as they pass backward. The anal circlet of feathers is just perceptible, but that around the oil-gland is not visible.

very great in March, and few are found later. I do not know that more than one species is resident.

Bernicla canadensis.

A few geese may come in October, but they are not plenty for a month subsequently. Some are to be seen in April, but the greater number depart in March. I think that occasionally a pair may remain to breed in the vicinity, as I have seen a brood in domestication, said to have been raised from the egg; a statement that bears weight from the impossibility of procuring young birds in any other way. But such instances are doubtless exceptional. Geese may be procured, in season, for a dollar, or even less, apiece; a fact of itself attesting their abundance.

Bernicla brenta.

Common in winter, and seen until April 6. This and the last were the only geese observed; nor did I ever hear the gunners allude to any white ones, though I should judge that *A. hyperboreus* would also occur in winter.

Anas boschas.

Very common.

Anas obscura.

Common.

Dafila acuta.

Common. Among the earlier October arrivals.

Chaulelasmus streperus.

Common.

Mareca americana.

Common.

Querquedula discors.

Nettion carolinensis.

Both teals are very common, and are among the first to arrive, and the last to leave; flights occurring in September, and sometimes even in August.

Aix sponsa.

Resident; abundant; breeds on the island.

The Anatinæ, as a group, are outnumbered in the harbor by the Fuligulinæ, and none of them are so numerous as some of the sea-ducks. The reverse is said to be the case on the inland waters.

[May 2,

Bucephala americana. (= *B. clangula?*)

Bucephala albeola.

Fulix marila.

Fulix affinis.

Aythya americana.

Of these the two last named are apparently the most abundant. The canvas-back I have never seen here.

Oedemia perspicillata.

Very common. Early in November, 1870, before the complement of general wild-fowl was made up, these were perhaps the most abundant ducks on the harbor, mixed with a number of the next species. By far the larger proportion were females and young. The young males at this season almost exactly resemble the females; having the two whitish spots on each side of the head, and bill wholly black, the place of the future black spot in the bill being indicated by a slight corrugation of the skin. But they are generally distinguishable by the presence of a few perfectly black feathers about the head, and by the rather more turgid bill.

Oedemia americana.

Common. The female and young are distinguished from those of the last by the different number of tail-feathers, different shape of bill, and the continuously whitish sides of the head; otherwise the resemblance is very close. Both are known as "black ducks," and by a probable further confounding with *A. obscura*, are pronounced good eating by those who do not intend to eat them.

Mergus serrator.

Very abundant. I should judge this to be the most numerous of all the family in this vicinity. They are always on the harbor from October to April, and a few both earlier and later; and are not much molested, being unacceptable even to not over-fastidious people. The distribution of their colors, showing large pure white areas, marks them out at any distance; the Bucephalæ being the only ducks to which they bear any special resemblance.

Pelecanus fuscus.

A few observed at irregular intervals through the summer months.

Sula bassana.

Several were seen during foul weather, in February and March, both years; but the species is not a common, if indeed a regular, winter visitor.

Graculus floridanus.

Cormorants may be seen at intervals the whole year, and are common except during the warmer months. There are two species; but I did not succeed in ascertaining their times of arrival and departure. The summer birds are all, without doubt, the *G. floridanus*, to which species a full-plumaged specimen, captured in the spring of 1869, belonged; and the winter ones are in all probability

Graculus dilophus.

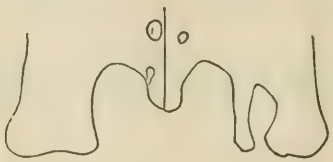
Very common in winter. Judging from the light brown appearance of most individuals observed at this season, they were chiefly young birds.

Puffinus fuliginosus.

A specimen taken May 21, 1870, in fine plumage, but injured in one of the webs; this disability probably accounting for its exceptional occurrence. It was caught by hand near the shore, and kept alive for some time. Placed on a level surface, it could with difficulty stand upright, and on endeavoring to walk, sprawled with the use of its wings and by hooking itself along with the sharp point of the bill—not, however, grasping with both mandibles. I was before ignorant of this method of assisting locomotion on land, but can readily believe it to be a habit of birds of this family, and a means of approaching and leaving the places where many of the petrels are known to breed. The bird showed some spirit, snapping with all its strength; but was perfectly silent.[1]

[1] Length 18, extent 40, wing 12, tail 4, bill $1\frac{3}{4}$, tarsus $2\frac{1}{4}$, middle toe and claw $2\frac{3}{8}$.

Some points in the coloration of this specimen might lead one to suppose it to be a state of *P. major*. The accompanying cut (of natural size) shows a great irregularity in the contour of the posterior border of the sternum.



Larus smithsonianus.

Winter resident; very abundant; the characteristic and only common bird of the family throughout that season. I have been repeatedly assured that some of the "sea-gulls," as this species is called in distinction from the smaller kinds, remain all summer, but have never seen any at that season, and doubt the statement, except perhaps in its application to diseased or otherwise disabled individuals. Some, however, certainly linger longer in spring than would have been anticipated, being seen almost until June. There is little falling off in their numbers in March; but most of them pass northward early in April, about the time that the Terns and *Chroicocephali* make their appearance. A few arrive in September, but they are not plentiful until the latter part of October. In consequence of being rarely molested, they become quite familiar, often mixing with the tame geese about the fort, and permitting themselves to be approached within a few feet; still, as a rule, they show that they have an excellent idea of gunshot range. Three styles of these gulls are easily distinguished. The birds of the year are smoky-brown (becoming grayer towards spring), and differ in this respect from the young of any other species occurring here. The birds hatched the previous summer but one are pale grayish, with the blue of the mantle showing in irregular patches, the primaries wholly black, and the rectrices either the same or white with a terminal black bar. The birds in their third year are in perfect plumage, but show the dusky streaking of the head and hind neck characteristic of the winter plumage. The bills of the birds of the first class are black; of the second, flesh-color, black-tipped; of the third, yellow, with or without the orange spot at the angle of the gonys. Most of the old birds regain their nuptial dress before leaving. They are rather silent during the winter, being rarely heard except when quarrelling for food; but in April, before they move off, the air resounds with their hoarse cries. Among the substances found in the stomach were the remains of a marsh-hare, though I hardly think that the animal could have been captured alive.

L. delawarensis.

Spring and fall; common, and *probably* also a winter resident, although I did not identify it at that season.[1]

[1] In winter the head and hind neck of this species are definitely *spotted* with blackish. In the case of the last species, and of, probably, the whole 1871.]

Chrœcocephalus atricilla.

Extremely abundant, in spring and fall. They appear the last of March or early in April, and become plentiful during the latter month. They remain so late, and are absent so short a time during the summer, that I think some breed near by, though I found none actually nesting in the vicinity. Probably only two years, instead of three, as in the case of the larger *Lari*, are required for them to assume the perfect plumage. The majority of the spring birds are in full attire, but among them a large number of the conspicuously brown birds of the preceding year are always seen. A few return in August, many more in September, and by the last of this month their number defies computation. It is no exaggeration to say that I have seen a thousand rise at the same moment from a single sand-bar where they were resting and pluming themselves after feeding. They fish in companies often of numbers but little inferior, following the shoals of small fry about the harbor, continually descending upon them, and rising on wing again after a moment's half-submergence. At such times they are in pursuit of the small fish that form the principal food of the blue-fish, and their presence is an unfailing guide. At this season the brown birds greatly outnumber the others. The adults are mostly moulting when they return, and retain traces of the spring plumage—seen in a slight glow of the under plumage, carmine tint in the dusky of the bill, red mouth, and slate about the head—at least until October, when the renewal is completed. The young of the year are quite definitely brown, etc., and bear little resemblance to the parents; but they may always be distinguished from any other gull by the length of the tarsus in comparison with the toes, and by the downward curvature of the end of the bill, which is sufficient to bring the tip nearly on a level with the angle at the symphysis. The birds thin

race of "herring-gulls," as *argentatus*, *occidentalis*, etc., the same parts are *streaked* with lighter dusky. In the gulls without black on the primaries, as *glaucus*, *glaucescens*, *leucopterus*, etc., this winter marking takes the form of obscure *clouding* with grayish. These distinctions hold good with all the species of the family with which I am acquainted, and, moreover, the *darkness* of the plumage of the young of the year, in all, is correspondingly graduated from smoky-brown to pale gray. Similarly, the primaries and tail-feathers of the "white-winged" gulls above mentioned are, for the first year, gray like the general plumage; while those of the others (including *marinus*) are black.

off in November, and few are seen after this month. I am not sure that *any* remain all winter.

Chrœcocephalus philadelphia.

Extremely abundant, but only in spring and fall, being strictly migrants here. They appear about the first week in April with the last species, generally remain through most of May, and return in September, remaining until the end of November. But this general statement may be somewhat qualified in detail by some observations that have interesting bearing, unless I wrongly interpret them. In 1869, from the beginning of April until the 22d, the birds were here in great numbers, and with a marked preponderance of old full-plumaged individuals. Without any change in the weather, or other assignable cause, they suddenly disappeared, presumably having moved northward. For a week or ten days scarcely one was to be seen; when they became more numerous, if possible, than before, and so continued through the greater part of May. This last lot was almost entirely composed of birds of the previous year, as shown by the plumage, there being hardly a black-headed one among them. I should judge, therefore, that the old birds migrate in advance of the young, and also that they move the more hurriedly of the two. It is probable, moreover, that only these adults were going to breed that year, although it is pretty certain that some gulls, at least, reproduce before gaining their perfect plumage. In the fall few black-headed ones are ever seen, the hood being lost before they reach this latitude; but even at this season the old and young are readily distinguished by other marks. Many return in September, and then the earliest ones to come are the young. I verified the same general observations through four migrations that I witnessed. This year (1870) there were few—almost no—birds in part of October, after the September young appeared to have passed on but as I write (Nov. 18) the harbor is covered with thousands of old ones in their winter dress. They appear at a little distance almost pure white, and are beautifully conspicuous among the other gulls and the terns with which they associate.

Audubon is certainly mistaken in representing the female of this species with a brown hood. The sexes are not distinguishable by any outward marks. If there is a United States gull with the head of the color shown in the plate just alluded to, it must

belong to a species that has escaped the notice of later ornithologists.[1]

Thalasseus regius.

This tern certainly breeds somewhere in the vicinity; for, although I did not find any nests, I saw it constantly through two summers, and occasionally noticed birds so young that they were still receiving attentions from their parents; while in June and July small flocks were often noticed pursuing so straight a course for long distances, that I had no doubt they were passing directly between their nests and their feeding-places. It commonly arrives from the south early in April, and through this and the next month is more abundant than at other times until the fall—a part, I presume, passing further north. It becomes numerous again in September, and so continues until the end of November. I cannot say whether or not any remain all winter, but think that, if observed at that season, it will be an exceptional case. It is more wary than any of the other terns, and is always the first to rise among the miscellaneous troops that fleck the sand-bars. It is conspicuous by its size and bright red bill; and the young are easily distinguished by the smaller size, yellow instead of red bill, and spotted plumage. The old birds lose the black pileum in September, the crown then becoming white, bordered behind by the long, loose blackish feathers of the occiput, and a few other dark ones on the sides of the head. The bill in winter is not so vivid in color as in summer, and much shorter. All the changes of the old are finished by October; but the young remain blotched, and with mere traces of the pearl-blue mantle, all the fall. I took one old bird with the feet curiously mottled with yellowish and black, and yellow claws—probably a pathological state, although the bird appeared perfectly healthy. These are vigorous, spirited birds, showing good fight when captured, and strong enough to bite pretty severely. Their voice is loud and raucous, though still without the deep guttural intonation of that of the shear-waters.

Thalasseus acuflavidus.

Chiefly a migrant, but also a winter resident, sparingly; none observed to pass the summer here. It becomes numerous early in April, with the last, and remains through part of May; returns

[1] Qu. *Larus capistratus* of Bonaparte's Synopsis.

in September (a few probably somewhat earlier), and is very common until December. A large number shot in the middle of September were in the same condition of plumage as *T. regius* was at the same time. The species may be marked out among its allies by its size, its singularly trim shape, conspicuously black, *long* bill, yellow-pointed, and a general *whiteness;* the mantle being paler than in any of the others. Specimens, even in the fall, frequently show a rosy blush of the under plumage, much like that generally supposed to characterize *T. elegans* of the California coast.

The difference in the pattern of the coloration of the primaries of this bird, that was noted in my "Review" as separating the species (or whatever it is to be considered) from the European *T. cantiacus*, has not failed in a single instance that has come to my knowledge. No reliance, however, can be placed upon the yellow tip of the bill as a character; this varies from *nothing* (in immature specimens) up to a third, or nearly, of the total length of the bill, and no two specimens show exactly the same line of demarcation between the yellow and the black. Specimens, as usual in this family, differ much in size, and particularly in the length and stoutness of the bill. The feet are always black, as in *T. regius*.

Sterna hirundo.

Very common, but only during the migration. Arriving from the south early in April, they all pass on during the following month. They are abundant again in September and October, perhaps a little earlier and later, but I identified none except during these months. In the spring they are scarcely to be told with certainty, unless shot; but in the fall they are conspicuous by the fact that they retain the black pileum, at least as long as they remain here. It has been stated, upon eminent authority, that this species never loses the black on the head; and, although I do not confirm this from examination of specimens taken in the depth of winter, my observations until the end of October support it, and I do not remember to have seen in any museum a Wilson's tern without the feature in question. Numbers shot here in September had completed the winter plumage, and were newly feathered, except on the crown, where the black looked worn and faded, but was still unmixed with white, except a few specks on the extreme front. I presume that the change on this part of

the body is very gradual. At this season the feet were simply orange-yellow, not vermilion, and the bill was dusky-shaded throughout. Some of the year's young had nearly perfect wing and tail feathers; but the mantle showed dusky mottling, with some blackish areas upon the wing-coverts; while younger still were marbled and otherwise beautifully variegated with gray, light brown, &c. In all the young, the feet were yellowish, more or less obscured; and the bill mostly black, with yellow or orange on the basal part of the under mandible; it was smaller than that of the old, not so horny, and more obtuse.

Sterna Forsteri.

Chiefly migrant, but also winter resident. Compared with the last, there is, I think, a difference in the migrations, &c., something like that I have endeavored to show in the case of the *Ammodromi*, this being the more northerly species of the two, migrating earlier in the spring and later in the fall, and wintering where *S. Wilsoni* does not; of the breeding I can say nothing from personal observation. A few Forster's terns come back in August; they become abundant the following month, and there is little or no decrease of their numbers until December, when a part go further south, to return the latter part of March, and the rest remain. It is one of the most plentiful terns on the harbor in October and November, when it may be distinguished at any reasonable distance with ease; Wilson's tern being the only one at all resembling it, and this being marked in the manner just indicated. Forster's at this season has the crown white, the occiput blackish, and a remarkably distinct black transocular fascia, better marked than in any other species of ours. In this plumage it is unquestionably *S. havelli*, Aud., as I pointed out some years since. The bill is nearly as in summer, but not so bright; the feet are orange instead of red. This plumage was finished in all of a number of old birds shot the second week in September. The young of the year can also be distinguished from the young of *hirundo* at ordinary gunshot range. The whole head is white, faintly washed with brownish, except the transocular fascia, which is pure black, and very sharply defined; but nearly all the feathers of the crown have dusky bases, that will increase during the fall and coming winter, until the condition above noticed is attained. The eye-stripe is $1\frac{1}{3}$ inch long and about $\frac{1}{2}$ an inch wide, reaching from the lores

[May 9,

through the eyes to and over the auriculars. The blue mantle only partly appears at this time, being lightly washed over with gray and clear brown; the rectrices are heavily dusky, as in *hirundo* at the same season, but the dark color is on opposite webs in the two species. The wing-feathers are new and perfect, and more hoary-silvery than those of *hirundo* of the same age; but the pattern of coloration is exactly duplicated. The feet are yellow, more or less obscured with dusky.

Sterna antillarum.

Summer resident, from early in April until October; and, except at the height of the influx of the other kinds, the most abundant tern of all. It breeds here in great numbers. Referring again to an article in the American Naturalist for September, 1869, for an account of its nidification, I have only to add here—

A tern shot May 17, had then an egg ready to be laid; but most of the eggs are deposited towards June, and during the fore part of that month. The first young birds I noticed were flying June 20th; but this was early for them, the broods not being fairly on wing until the middle of July. During all of May and June, indeed, there are plenty of immature birds about; but these, it should be observed, are of the last summer's broods, rendering the conclusion obvious that at least two years are required to assume the perfect dress. These birds have the bill black, no black cap or white crescent, slaty auriculars and occiput, dark bar along the front edge of the wing, imperfectly colored primaries, and slightly forked tail; thus not possibly to be confounded with birds of the season, which are curiously variegated with gray-brown, and white, and show no pearly blue. The yearlings were in plenty with the adults at the breeding-grounds; but whether or not they were paired and had eggs too, was plainly impossible to determine, as terns' eggs are almost never identified as to the exact parent, when numbers of the birds are breeding together. The usual number of eggs, I may repeat, is two, not three, and often only one is laid; they do not average over $1\frac{1}{4} \times 1$ inch. The black tip of the bill of this species varies from *nothing* to a fourth of the length of the bill. The distinctions between the species and *S. minuta* are constant and perfectly satisfactory.

Hydrochelidon fissipes.

Migrant only; very abundant. This tern differs somewhat from the rest, in its times of migrating and other particulars. It is not very common, comparatively, in spring, and passes north swiftly and silently. The first spring I saw none until May 15th, and had begun to think that I had missed them, or that they were migrating inland, when they became plenty, but only for a week or ten days. All that I saw were in perfect spring dress. They return in the van of all the terns, about the second week in August, when many are still black, but by far the greater number in the plumage of the young. They remain until October—not later, I think—and during September are as common as any of the others. Although they flock with the rest over the harbor, and on its sand-bars, they also frequent the marsh, where they flutter about for hours, busy catching insects—chiefly grasshoppers, I think—in a manner that reminds one of night-hawks similarly engaged; and, in fact, the two birds are frequently associated together at such times.

Haliplana fuliginosa.

Concerning this species I can offer nothing beyond the record of the appearance of a flock *March* 16, 1869, during a southwest gale. I have seen none since, and can as little account for this as for their isolated appearance on that occasion. If, as is most probable, the gull-billed, arctic and roseate terns pass this point, they escaped me altogether.

Rhynchops nigra.

These birds I have only noticed late in the summer, and during the autumn, though I presume that they pass by in the spring; none breed here, to my knowledge. In September they become plentiful, and so continue until the latter part of November, some doubtless remaining later. In examining large numbers of specimens, I find a great difference in size, and particularly in the bill. Some individuals are fully a third heavier than others. The bill varies over an inch in length, and especially in the length of the under mandible. Sometimes the difference between the two mandibles is hardly a third of an inch; at others, over an inch. The oblique striæ on the under one are sometimes obsolete. In high condition, the bill is bright red (vermilion) and black; otherwise, orange and black, or even mostly dusky, only yellowish at base.

[May 9,

The young in the fall are curiously variegated with dusky and whitish above—few specimens being exactly alike. The note of this species is instantly distinguished from that of any of our other species of this family by its deep guttural intonation, more like the croaking of some herons than the cries of the gulls and terns. The bird also differs from its allies in going in true flocks, as distinguished from the gatherings, however large, in community of interest, that occur with the gulls and terns. The birds move synchronously, which is not the case with any of the others. They feed chiefly by night, or at any rate in the dusk of evening, at which time, in passing over the harbor, one may hear their hoarse notes on every hand, and see the birds gliding swiftly along just over the water, either singly or in small flocks. During the day-time, when the gulls and terns are busy fishing, the skimmers are generally seen reposing on the sand-bars, and they never drop on their prey like their allies. Their mode of feeding is not exactly made out, but it is believed they skim over the surface with the body inclined downward, the bill open, and the under mandible in the water, so that they really take their prey in a manner analogous to the feeding of whales.

Colymbus torquatus.

Abundant winter resident, from the latter part of September until May. The greater part, however, do not arrive until some time in October, and a few linger through a portion of May. I took one full-plumaged bird alive in the latter part of June; but it had evidently been prevented from migrating by sickness, and died shortly afterward.

Podiceps cristatus.

Occasional, in winter. (Specimen, January 29, 1870.)

Podilymbus podiceps.

Frequent, in winter.

III. REPTILES.

I am indebted to my friend Mr. J. A. Allen, of Cambridge, Mass., for identification of some of the specimens.

Sauria.

Cnemidophorus sexlineatus, D. & B.

Very abundant on the islands and sandy parts of the adjoining mainland. They appear usually early in April, and may be

found until cold weather in October. In spite of their remarkable agility, they are one of the animals oftenest found in the stomach of the larger snakes.

Alligator mississippiensis.

Of common and regular occurrence in the swamps of the adjoining land, and *said* also to occur in the woody, marshy part of the island.

Ophisaurus ventralis, Daud.

One of the most abundant and characteristic reptiles of the island. The first examples noticed each year were taken the third week in March, and this is probably the usual time of their appearance. Like the smaller lizard, they are out until the cold weather of October. They avoid the wetter parts of the island, and are especially numerous in open grassy places, as about the fort, where they may be almost daily taken during the summer. They appear rather inactive, if not sluggish, make little or no resistance when captured, and readily become tame. With an average length of a foot and a half, specimens were taken ranging from a few inches to nearly a yard; and the tints vary greatly, the variation being apparently a matter of individual peculiarity.

Ophidia.

Caudisona horrida (*Linn.*), Cope, Pr. A. N. S. Philada. 1859, 338, and Smiths. Cont., Jan. 1861, 122.

Common in the vicinity, and certainly occurring on the islands as well, though not obtained there. One specimen measured upwards of five feet in length.

Ancistrodon contortrix, B. & G.

Common, chiefly in low, moist places.

Nerodia sipedon, B. & G.

Rather uncommon here, according to my observations. One specimen was taken in the open sea, swimming among the breakers.

Ophibolus getulus, B. & G.

Common. Females with eggs taken in July. One specimen, nearly 6 feet long, presented a different pattern of coloration from that usually seen; one set of branches of the series of bifurcations of the yellow lines being defective, giving the snake the appear-

ance of being obliquely banded, without perfect distinction of the black hexagons along the back.

Bascanion constrictor, B. & G.

Very common.

Lepotophis æstivus, Holbr.

Of frequent occurrence, particularly in thick bushy places.

TESTUDINATA.

Malacoclemys palustris, Ag.

Very abundant.

Chelonia midas, Schw.

Common.

Besides the foregoing, three other species, not determined, were noticed, one of which is called "chicken-turtle," and another is a *Cistudo*.

No species of batrachian was noticed on the island during my residence. On the mainland, and also on Shackleford, two species of *Rana* (undetermined), and a *Hyla*, were observed. The toad (*B. lentiginosus* = B. americanus?) is very abundant on the mainland. Great numbers were observed in the ditches, March 27, 1869, and within a few days of the same time the following year, copulating and very clamorous. Probably, then, this is their usual time of spawning.

(To be continued.)

With the Author's Compliments

From the American Naturalist, August, 1871.

PROGRESS OF AMERICAN ORNITHOLOGY. — Mr. Allen's* latest, and in all respects his most valuable, memoir embraces several distinct essays, for which the Mammals † and Winter Birds of Florida seem to furnish merely the occasion, and are, at any rate, overshadowed by the importance of the general questions discussed. He has worked long and faithfully upon a subject of broad interest, and his labors will receive attention, no less from those who differ from him, than those whom he convinces. Standing squarely opposed to the great majority of ornithologists, his arguments must be refuted, or his position endorsed. In our present character of unwilling critic, we endeavor to speak in the same earnest spirit of inquiry that tempers Mr. Allen's page; and may possibly succeed in showing how trivial is the real point at issue between Mr. Allen and those of us from whom he appears to differ so widely.

Mr. Allen's lists and field notes, which result from several months investigation, are collated with Mr. Maynard's and Mr. Boardman's, and "may be considered as equivalent collectively to the labors of a single observer constantly in the field for at least four or five winters." (p. 161.) They are properly prefaced with a sketch of the physical features of the country, from which

* On the Mammals and Winter Birds of East Florida, with an examination of Certain Assumed Specific Characters in Birds, and a sketch of the Bird-faunæ of Eastern North America. By J. A. ALLEN. *Bulletin of the Museum of Comparative Zoology.* Vol. II, No. 3. pp. 161–451. pls. 4–8. 1871.

† The list of Mammals comprises thirty-five species, among them the *Trichechus manatus*, "still quite common in the Indian River," and a large bat, probably one of the West Indian *Megadermatidæ* new to our fauna, but unfortunately not identified. Here as elsewhere, the writer's extreme views are conspicuous in the several synonymical lists, and technical discussions. In the case of "*Ursus arctos*" we may observe that even those who might assent to the identity of our grizzly with the huge bears of Northern Europe, would not admit *U. Americanus* to be a mere synonym.

we gather two interesting points. The irregularity which Audubon noticed in the pairing and breeding of some resident species, corresponds to the gradual and protracted development of the vegetation; the mildness of the winter causing an almost perennial verdure, and four weeks in February and March being required to accomplish the work of one in May at the North. The other fact, of diminished vivacity of the birds during the breeding season is of similar significance. "In spring, at the North, the woods . . are vocal with bird-music; but in Florida no such outburst of song marks the vernal season; . . the songs of some are much abbreviated, and so different from what they are at the North as to be sometimes scarcely recognizable." (p. 166.)

The list of birds, considered as simply such, shows the same care and fidelity that mark all Mr. Allen's papers, and supplies a special desideratum. Our local lists of the Atlantic coast may now be considered nearly complete, and they collectively afford a very perfect ornithological map from Labrador to Florida. To the one hundred and eighty-three species here given either as permanent residents or winter visitors — these two classes being carefully discriminated — a few perhaps will be hereafter added, but certainly not may remain unnoticed. We do not observe any name previously unrecorded, or, at least, not to have been anticipated from the known range of habitat. Aside from the critical dissertations, and the tables of measurements, that the list contains — neither of which are essential to its integrity, and which, therefore, we shall presently notice in another connection — its chief value rests upon the copious and accurate field-notes, which are always reliable, and generally represent important items of information. The extensive lists of synonyms, however interesting as indices of the writer's peculiar views, or valuable as bibliographical compilations, are nevertheless, we regret to think, of little consequence in some respects, and in others positively injurious. Some of them must tend, we feel sure, to bring Mr. Allen's general work into disrepute. When, for instance, we see (p. 300) *Chordeiles Texensis* given as a synonym of *C. popetue*, it is certain, that however truthful the author may be in the general tenor of his way, he sometimes exceeds the utmost limits of propriety. One who wields so free a lance as Mr. Allen's, should be sure his own vizor is well down: and a blunder like this looks still worse from its inconsistency. For, in another place (p. 355),

he does us the honor (his endorsement in such a case is an honor) to recognize our *Pelidna Americana* — a bird that cannot stand a moment upon Mr. Allen's platform; and in one or two other instances — that of *Graculus Floridanus*, for example, unquestionably a southern form of *G. dilophus* — he is similarly untrue to his principles.

Among the critical discussions that we mentioned just now, is a highly satisfactory elucidation of the several interesting modifications in size, form and color that result from climatic and other physical influences upon the birds. The decrease in stature, coincident with lowering of latitude, was perhaps already sufficiently known; but the other points needed the excellent exposition they receive at Mr. Allen's hands. He shows a singular tendency to increase in the size of the bill of Floridan birds. This corresponds exactly to the remarkable elongation of the tail of many southwestern forms; and his explanation — greater activity of peripheral circulation — is doubtless as applicable to one as to the other. The third characteristic of Floridan forms is an intensity of coloration, as compared with Northern broods of the same species. This is well illustrated in the Quail, and several other species, particularly the curious little *Pipilo* in which the white markings of the wings and tail are at a minimum, though the iris, singularly enough, is white instead of red.* It would be difficult to over-estimate the importance that attaches to this admirable elucidation of the peculiarities that collectively distinguish the Floridan birds. Interesting in itself, additional value is gained in its affording data for a similar exhibit of the relationships of the birds of the Lower Rio Grande and Colorado rivers. Numerous forms from these regions, as well as from the peculiar Cape St. Lucas locality, can be better interpreted now that we have analyzed that portion of the Eastern Province lying within corresponding degrees of latitude; and many that have been named as positive specific forms, and taken to be such, may prove merely indices of geographical variation occurring in strict accordance with laws that Mr. Allen

* PIPILO ALLENI, *nob.* — *P. erythrophthalmo* similis, sed minor, alis caudâque minus albo-plagiatis, et iridibus albis. This interesting "form," which we believe remains unnamed, we have great pleasure in dedicating to our esteemed friend.

An anonymous writer of some pleasant articles on our birds in Appleton's Journal (iv, p. 258) says: "The 'Chewink' is perhaps the most curious instance of change in the color of the iris, which with the summer dress is red, and with the winter, white — the change taking place sometimes first in one eye, and then in the other, during the process of the autumn moulting." This, if so, is new to us.

has demonstrated. In some cases indeed, Floridan forms furnish exactly intermediate links, as when the Floridan *Thryothorus* grades from *Ludovicianus* proper into *Berlandieri;* and again there are cases, like that of the Quail, where the Floridan form, although unnamed, is as different from average Northern samples as *O. Texanus* is. Promulgation of data so pertinent to the general question of variation in feral animals is a service of great moment to ornithology, and Mr. Allen's careful handling of the subject elevates his "Winter Birds of East Florida" to a place that no mere annotated catalogue, however good, could claim.

Still keeping away from the main issue, we will note certain discussions, some relevant and others not so, that the Floridan list affords. Bartram's somewhat celebrated "Sacred Vulture" certainly needed the overhauling it gets; Mr. Allen finds it a myth, based upon *Sarcorhamphus papa*, with a dash of *Polyborus tharus*, and an infusion of Bartram's imagination; which is pretty much as was to have been expected. The origin of the domestic turkey is handled at some length. After fusing *M. Mexicana* with *M. gallopavo*, Mr. Allen attempts to refute LeConte's and Baird's theories, arguing that the domestic bird was reimported from Europe, whither it was originally carried from Mexico. Among other discussions, are those upon the species of *Cathartes*, *Buteo*, *Parus*, *Passerculus*, *Quiscalus* and *Turdus*, in which the writer pleads for a much less number of species than are usually admitted, and presents some astonishing lists of synonyms. We have no other objection to these disquisitions, than that they lead to nothing tangible, for they seem to us to be merely a recapitulation of what was before known of the close resemblance, and wide limits of variation, of the species in question; the *opinion* that Mr. Allen offers of their specific identity being, of course, a foregone conclusion from his premises. It seems to us unnecessary for Mr. Allen to raise the *Hylocichla* question for the third time, merely to repeat, with some expansion, the remarks that appeared in his "Birds of Massachusetts" and "Birds of Iowa"; no good can result, we conceive, from rehearsal of items already the common property of ornithologists, or from reiteration of individual opinion.

The many extensive and elaborate tables of measurements that enrich the "Winter Birds of Florida," and show not only the discrepancy in size between Floridan and Northern birds, but also the

variations in each of these, may be regarded as collateral with, or supplementary to, Mr. Allen's highly interesting and suggestive "Examination of Certain Assumed Specific Characters in Birds." This constitutes Part III of the memoir, and is the nucleus of the whole. Every paper of Mr. Allen's which we have had the pleasure of studying has plainly disclosed the drift of his views, and in this one his energies are focussed on an attempt to show that a very large proportion of the forms we commonly designate by means of the binomial nomenclature ought not to be so designated. The proposed reduction in our nominal lists is to be effected mainly by discarding all names imposed upon "*geographical differentiation*" among birds. We say this advisedly; for, since no ornithologist upholds the practice of naming *individual* variations, local or other climatic varieties are all that he has to fight against in his present crusade. The attack is first made, very judiciously, with an elaborate and interesting exposition of purely individual variation in birds, based upon an examination of extensive series of specimens.

Mr. Allen says (p. 188), that he has the material to "disclose a hitherto unsuspected range of purely individual differentiation;" but this we are not prepared to admit. Fully aware ourselves of the extent of variation that he demonstrates, we cannot presume that other ornithologists are less informed. Still we must, in the same breath, do Mr. Allen the justice to add that he shows the known wide range of both individual and climatic variation to be more extensively applicable than we practically consider it; in short, that he proves what we are accustomed to regard as exceptional to be the rule. Several prominent phases of individual variation are discussed. In *color*, he holds that it is solely a matter of intensity, "while in allied species there is almost always an appreciable variation in the *style of coloration*" (p. 187), and illustrates the fact with many examples. This is so true, that we wonder how Mr. Allen can unite *Chordeiles Texensis* with *C. popetue*, while he keeps *Rallus elegans* and *R. crepitans* apart; for, in the latter case, the difference is solely in intensity, while in the former it is largely in style of coloration! Other color-variations, as those dependent upon age and season, are faithfully presented; but these have not, perhaps, on the whole, so much importance as the differences in size and proportion of parts, to which he justly gives special attention. His admirable tables of meas-

urements demonstrate what he claims — that many or most species, vary in total stature, in the length of different members, and in the relative proportions of different parts, from twelve to eighteen per cent. of the mean dimensions. This, it should be remembered, is independent of *geographical* differentiation; and it will, we trust, be enough to put us on our guard, against too ready acceptance of slight discrepancies in size as an element in our diagnoses of species. To cite but a single case in point: — twenty-seven specimens of *Parus atricapillus*, taken in the same locality and at nearly the same time, differ *over an inch* in length; that is, they grade between the extremes of *P. septentrionalis* and *P. Carolinensis*.

"Climatic differentiation," like individual variation, is shown to occur under three principal phases: — in total size, in length and stoutness of bill, and in color. The first of these is well known and need not detain us. The second consists in the curious fact above mentioned, of development of the bill in *inverse* ratio to the size of the bird, with decrease in latitude. Climatic variation in color, Mr. Allen holds, may be in respect of both latitudinal and longitudinal conditions. In the matter of latitude, he shows a gradual increase in intensity of color to the southward, probably dependent upon the greater energy of the sunlight; and in this way disposes of several West Indian forms, commonly reputed as species, pointing out that they are not more different from their Floridan analogues, than these are from New England examples. As to longitudinal variation, Mr. Allen brings prominently forward the fact that "the general tendency from the East westward, is to darker or deeper colors in specimens of the same species" (p. 237), and supports this by numerous unquestionable cases, many of which will readily occur to the reader. The very notable exceptions afforded by the bleached specimens of the Colorado desert, furnish the occasion for what we regard as decidedly the most important point in the whole discussion, and one that we do not remember to have seen in print before. Under head of "Causes of Climatic Variation" (p. 239), Mr. Allen takes *humidity of the atmosphere*, as determined by the *mean annual rain-fall*, to be the real cause of this intensity of color. In examining Dr. Foster's "The Mississippi Valley," some time since, we were struck with the determinations there made of the hygrometric influences resulting in the production of forest, prairie and desert, according to the mean annual water-supply, and, at the same time, perceived the

exact relations that subsist between the average intensity of coloration of the birds that collectively inhabit the regions so defined. We are gratified to find ourselves endorsed by Mr. Allen's investigations, as appears from the following paragraph: —

"I had long suspected that hygrometric conditions had much to do with local variations in color in individuals of the same species, but I was not a little surprised when I came to compare the known areas most prolific of dark or light local forms with rain-charts — which may be assumed as indicating relatively the hygrometric conditions of different regions — to find the distribution of the light colored races so strictly coincident with the regions of minimum mean annual rain-fall, and the dark forms with those of maximum mean annual rain-fall, as seems to be the case. Humidity has hence apparently more to do with climatic variation than solar intensity." (p. 240.)

Part III concludes with a vehement protest — certainly not lacking in the force that comes of conscientious and earnest belief — against the custom of naming forms, however distinct, that are found to intergrade; and at the risk of protracting this notice beyond due bounds, we cannot, in justice to our author, refuse to follow him further, although by so doing we must defer (perhaps to take up in another connection), what we should wish to say respecting Part V, in which the several bird-faunæ of eastern North America are defined.

Mr. Allen undertook a laborious and not entirely grateful task; and has won enviable laurels in its execution. It is so discouraging to the strongest swimmer to feel that he is breasting the tide of nearly universal opinion, that moderate success must be correspondingly acceptable. If it be something to deserve thorough criticism it is more when close scrutiny detects nothing worse than indiscretion. From the nature of his task, he was peculiarly exposed to the danger of over-doing; and in using the old maxim, *ne quid nimis*, we indicate the pith of what adverse criticism we feel compelled to make. In contributing invaluable material, carefully elaborated and forcibly presented, Mr. Allen seems nevertheless to have viewed his theme through the medium of enthusiastic iconoclasm so refractive that he has lost some of his bearings, and reached a position so extreme, that we fear ornithologists must suspect his reasoning simply because his premises are unquestionable and his conclusions untenable. And what does he offer instead of the idols he deposes? After being shown what is not a

species, we have a right to demand that he should say what a species is. But this is all we have: — "The question of species and of specific synonymy is simplified to this: that whenever two forms which have both received specific names are found to intergrade, the more recent name shall become a synonym of the older." (p. 245.) Simple and easy as this seems, it presents great if not insuperable obstacles; and we will add just here, that this shifting of the question from the vital point, namely, the discussion of what a species is, to a superficial issue, namely, the propriety of imposing names upon this or that form, is not what we should have expected from a naturalist of Mr. Allen's position.

Following his rule we hold our nomenclature by a frail tenure indeed; for nothing in biology is more certain than that the multitude of animals and plants now existing, are the ramifications of comparatively few trunks; and nothing is more unstable than intergradation which he proposes as a crucial test. To speak roundly, *everything runs into something else;* not necessarily just now (though this is frequently the case), but at some period. "Species," like some plants, are *stoloniferous;* they produce offsets that finally separate from their parent stock, and appear like distinct entities. Our *positive* specific forms — those that alone we should recognize, according to Mr. Allen — are simply those whose wide divergence has concealed or broken their connections with the original stem; while all debatable forms (and these constitute a great part of our lists) are merely those that are in visible process of separation. When a form has diverged to the slightest appreciable degree, some ornithologists, like Brehm, for instance, label it with a binomial; most ornithologists, probably, wait till they think that this divergence is a settled thing not likely to revert; but nearly all will name with the connecting links before their eyes. Mr. Allen, however, like Prof. Schlegel, would virtually ignore the process of divergence, until it has reached a certain, or rather an uncertain, point, and effaced connections that once existed. We are opposed to this, and still plead for names, if only as "convenient handles for facts" that it is of the last importance to bear in mind. Pure synonyms are pure trash, of course, and none detest them more cordially than ourselves; but we insist upon the advisability, *in the present stage of our science*, of recognizing geographical and some other differentiations by name. * No stronger

*Not necessarily a "specific" name, but some one additional word, with or without

evidence of the utility of this could be desired than is afforded by the advance of our knowledge of American birds within the last ten or fifteen years; for it is undeniable that the searching scrutiny to which they have been subjected has been facilitated by the custom of Prof. Baird and others of naming *all* recognizable "forms," without the least reference, even by implication, to the abstract question of species. Mr. Allen himself admits that these geographical binomials "have furnished stepping-stones to later generalizations;" a very proper admission, for the road he has just travelled with signal success was first opened, and afterward smoothed by them. The present is no time to discard such useful adjuncts: let the scaffolding stand till the building is finished.

We hold that the whole matter at issue between Mr. Allen and most of the rest of us is a war of words—a mere difference of opinion as to what a binomial may properly be used to express.

To illustrate: Assume that *Sturnella magna*, *neglecta*, *Mexicana*, *hippocrepis* and *meridionalis* are climatic differentiations, and that very likely they all came from one pair of birds. Mr. Allen would of course be the first to disclaim any more information than Dr. Sclater, for instance, possesses. Both these gentlemen know exactly how the case stands; but one of them chooses to predicate *Sturnella magna* upon a diagnosis wide enough to include without specifying the five forms; while the other chooses to sort out the five lots and label each of them with a different name. We repeat Mr. Allen's own words; it *does* "depend entirely upon individual predilection whether two, three or four 'species' or 'binomial forms'" shall be recognized; and to argue the point, under color of discussing the origin and nature of species, is to saw the air. A species, as far as naming it is concerned, is quite as much an opinion as a genus or a family is; for it is certain that genera and that families shade into each other. If the test that Mr. Allen proposes for species be applied to higher groups, our nomenclature falls to the ground; and if it be not thus applicable, it is equally inapplicable to species. By what rule would Mr. Allen separate *Trupialis militaris* from *Sturnella magna?* In spite of the fact that these are not known, at present, to intergrade, there is no assur-

the sign "var.," that shall stamp the form we wish to signalize. Perhaps this would be a judicious middle course, most applicable to the present state of the science. But if use of a regular binomial for geographical races be an evil, lumping them all under one name, as pure synonyms, with no hint of the different shades of meaning they represent, is assuredly a greater evil, and one that seriously militates against the progress of ornithology, if, indeed, it does not tend to throw the science back.

ance that if the difference in climate, etc., between Kansas and Pennsylvania has differentiated *S. neglecta* from *S. magna*, greater yet parallel discrepancies in physical conditions have not in the course of time changed yellow to red, and made *Trupialis* out of *Sturnella*. Refusing to name one short offset, we must refuse to name another, if a longer one; and must add *Trupialis militaris* to the synonyms of *Sturnella magna*. The instability of "species" (which are practically our units of zoological computation) once admitted — and it is admitted by leaders in all branches of natural history — it becomes a logical necessity to admit a corresponding instability of all groups based upon an aggregation of these units; and if we are not to name *Sturnella neglecta*, because it is only a little differentiation of *S. magna*, we cannot consistently name a king-crab because it is great differentiation of a trilobite. All differentiations are or were once, gradual and imperceptible; all are of degree only, not of kind; to name, or not to name, is a matter of individual discretion. Mr. Allen's plan, fully carried out, renders our nomenclature simply an index of our skill or luck in tracing links between species; and if our efforts could be commensurate with his enthusiasm, we could not consistently name anything.

To our mind, this forcibly illustrates the inefficiency of the Linnæan nomenclature as an adequate method of formulating our knowledge. It answered, when a thing was either square or else it was round — when species were held for fixed facts as separate creations; but now that we know a thing may be neither square nor round, but something between, it is lamentably defective. Not many years hence, we trust, naturalists will have discarded it for some better method of notation; and then the wonder will be that we advanced so far with such a stumbling-block in the way. Who shall say how much the advance of chemistry, for instance, or of philosophic anatomy, has been facilitated, or indeed rendered possible, by the invention of expressive symbols and apt formulas? or how much of the acknowledged confusion in zoology and botany flows from our cramped method of expressing our views? If we must continue to use a tool so blunt and unhandy as the binomial nomenclature, all cannot be expected to use it with equal skill and effect. — Elliott Coues.

[From the American Naturalist, Vol. V, November. 1871.]

BULLOCK'S ORIOLE.

BY ELLIOTT COUES.

Although the beautiful bird referred to in the works cited* has been known by name for nearly half a century, no complete biography has yet appeared; and doubtless many readers of the Naturalist will be glad to have such information as we can furnish from our study of its habits. We will premise that it is a near relative of the Baltimore oriole, or fire-bird, or hangnest, as it is indifferently called; a bird whose striking colors and brilliant vocal powers, together with its abundance in our streets and orchards, have made it a well-known favorite. Like the Baltimore, it is chiefly black and orange in color, but it differs in having a large white patch on the wings, and the sides of the head and neck orange instead of black. The female, as in all the orioles, is smaller than the male and with hardly a trace of his

**Xanthorthus Bullockii* Swainson, Phil. Mag. i, 1827, p. 436.—Audubon, Orn. Biog. v, 1839, p. 9, pls. 388, 433, and 8vo, ed. iv, 1842, p. 43, pl. 218.—Pacific Railroad Reports, vi. 1857, p. 87; ix, 1858, p. 549; x, 1859, p. 52; xii, 1859, p. 209, and Mex. Bound. Survey, ii, pt. 2, 1859, p. 20.—Coues, Proc. Acad. Nat. Sci., Philada., 1866, p. 55.—Cooper, Cal. Birds, i, p. 273.—*Psarocolius auricollis* of Maximilian.

brilliant hues, being plain olive-grey above and whitish beneath with pale yellow on the head, breast and some other parts. The young male at first resembles the female. This is only one of countless cases in which the sexes bear such relations in color. The mother-bird, almost defenceless amidst many dangers, and wholly incapable of protecting her young, is shielded by her humble garb, matching the foliage in which she lives, that she may pass to and from her nest unobserved, and accomplish her important maternal offices in safety. We may judge how well this beneficent design is accomplished, by a glance at any of our large collections where this species is represented; for a dozen or more of the richly attired males will be found for one of the female.

Fig. 120.

Bullock's Oriole.

Of the many beautiful orioles that inhabit Tropical America, only two—the Baltimore and the orchard—range northward through the Eastern United States. In the west, several kinds reach our southern borders, but Bullock's is the only one that proceeds further north. Its distribution in the west corresponds, in a general way, with that of the Baltimore in the east. It inhabits all the wooded portions of the Rocky Mountain and Pacific regions of the United States; in most of its range it is separated from the *habitat* of the Baltimore by the intervening treeless Central Plateau, though the two species approach closely, if indeed they may not be found together, along the Upper Missouri. We have no record of its reaching into British America, but should not be surprised to learn that it extends its range beyond the United States in summer. Being strictly a migratory species, like all of its family, it passes south in the fall, to winter in the

warmer parts of America. It appears in Lower California in March, but does not complete its migration into the United States until some time in the following month, when the forests it loves to dwell in are clothed with verdure. In the pine clad mountains of Arizona and New Mexico, we never saw it until about the middle of April; then, and until the cool weather of September, we were almost daily gratified with the sight of the gaily-hued birds gleaming through the sombre foliage like tiny meteors, and with the sound of their musical voices awakening echoes along the deepening aisles of the woodland.

In the countries just mentioned, the belts of thick cotton-wood and willows that generally fringe the streams are favorite resorts, perhaps because the pliant twigs are best suited to their wants in constructing their nest. All the orioles are wonderful architects, weaving pensile nests of soft pliable fibrous substances with a nicety and beauty of finish that human art would vainly attempt to rival. These elegant fabrics are hung at the end of slender twigs, out of reach of ordinary enemies; and though they may swing with every breath of wind, this is but cradle-rocking for the callow young, and it is a rude blast indeed that endangers the safety of their leafy home.

Little time passes after their arrival before the modestly-attired females, rambling silently through the verdure, are singled out and attended each by her impetuous consort, who sings his choicest songs, and displays the prowess she admires most. His song is an elegant paraphrase of the Baltimore's, with all its richness and variety, though an ear well skilled in distinguishing birds' notes can readily detect a difference. Their courtship happily settled, the pair may be seen fluttering through the thicket they have chosen, in eager search for a building-place; and when a suitable one is found, no time is lost in beginning to weave their future home. It is a great mistake to suppose that birds of the same species always build in the same way. Though their nests have a general resemblance in style of architecture, they differ greatly according to their situation, to the time the birds have before the nest must be used for the reception of the eggs, and often, we are tempted to think, according to the taste and skill of the builders. In their work of this sort, birds show a remarkable power of selection, as well as of adapting themselves to circumstances: in proof of which we have only to examine the three beautiful specimens now lying

before us. Each is differently constructed; and while all three evince wonderful powers of weaving, one of them in particular is astonishingly ingenious, displaying the united accomplishments of weaving and basket making. Before proceeding, we may premise that the idea of the nest is a sort of bag or purse, closely woven of slender pliant substances like strips of fibrous bark, grasses, hair, twine, etc., open at the top, and hung by its rim in the fork of a twig or at the very end of a floating spray.

The first nest was built in a pine tree; and if the reader will call to mind the stiff nature of the terminal branchlets, each bearing a thick bunch of long straight needle-like leaves, he will see that the birds must have been put to their wits' end, though very likely he will not be able to guess how they made shift with such unpromising materials. They made up their minds to use the leaves themselves in the nest, and with this idea they commenced by bending down a dozen or twenty of the stiff slender filaments, and tying their ends together at the bottom. If you have ever seen a basket maker at work, with his upright pieces already in place, but not yet fixed together with the circular ones, you will understand exactly what the birds had thus accomplished. They had a secure framework of nearly parallel and upright leaves naturally attached to the bough above, and tied together below by the bird's art. This skeleton of the nest was about nine inches long, and four across the top, running to a point below; and the subsequent weaving of the nest upon this basis was an easy matter to the birds, though, if one were to examine a piece of the fabric cut away from the nest, he could hardly believe that the thin yet tough and strong felting had not been made by some shoddy contractor for the supply of army clothing. Yet it was all designed in a bird's little brain, and executed with skilful bill and feet.

Perhaps the young birds that were raised in the second nest did not appreciate their romantic surroundings, but their parents were evidently a sentimental pair. If they did not do their courting "under the mistletoe," at any rate they built a cozy home there, tinting the sober reality of married life with the rosy hue of their earlier dreams. The nest was hung in a bunch of the *Arceuthobium oxycedri*, an abundant epiphytic plant that on the western wilds represents the mistletoe, and recalls the cherished memories of holiday gatherings. The nest was a cylindrical purse some

six inches deep and four broad, hanging to several sprays of the mistletoe, which were partly interwoven with the nest to form a graceful drapery. The felting material was long, soft, vegetable fibre of a glistening silvery lustre, in artistic contrast with the dark-hued foliage. A few hairs were sewn through and through, for greater security, and the pretty fabric was lined with a matting of the softest possible plant-down, like that of a button-wood or an Asclepias.

The general shape and the material of the third nest were much the same as those of the last; it was, however, suspended from the forked twig of an oak, and draped almost to concealment with leaves. But it had a remarkable peculiarity, being arched over and roofed in at the top with a dome of the same material as the rest, and had a little round hole in one side just large enough to let the birds pass in. Such a globular nest as this is probably exceptional; but now it will not do to say that orioles always build pensile pouches open at the top.

The eggs of this species are four or five in number, and rather elongated in form, being much pointed at the smaller end. They measure on an average just an inch in length, by about two-thirds as much in greatest diameter, which is much nearer the larger than the smaller end. In color they are very pale bluish, or rather whitish with a faint dull blue shade, and are everywhere irregularly overrun with fine sharp hair lines of blackish brown, or blackish with a slight tinge of purplish. These curious zigzig markings are characteristic of the eggs of a majority of the birds of the family (*Icteridæ*). They have no definite style, but wander at random over the surface, and in no two specimens are they alike. Thus in one specimen the lines, fine as hairs, are wound round and round the butt, with such regularity that they hardly ever interfere; in others, they are snarled up in different places; and sometimes, particularly at a sharp turning-point, the lines spread into little spots; and there are often a few such isolated markings in various places over the egg.*

We need say nothing of the general habits and manners of Bullock's Oriole, for it does not differ from the well-known Baltimore bird in these respects.

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*The nests and eggs above described were collected in California and are now in the Smithsonian Institution, where we have been generously allowed to examine them

With the author's comp[liments]

U. S. NORTHERN BOUNDARY COMMISSION:

ARCHIBALD CAMPBELL, Esq., Commissioner.

Maj. W. J. TWINING, U. S. Engrs., Chief Astronomer.

NATURAL HISTORY.

No. I.

ON THE MURIDÆ.

BY

Dr. ELLIOTT COUES, U. S. Army,

SURGEON AND NATURALIST OF THE COMMISSION.

REISSUED, WITH ADDITIONS,

FROM THE

PROCEEDINGS OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, 1874.

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I. ON THE MURIDÆ OF THE NORTHERN BOUNDARY SURVEY, WITH A CRITICAL REVISION OF THE NORTH AMERICAN GENERA AND SPECIES.

THE present is the first of a series of preliminary zoological reports which may appear from time to time, during the elaboration of the material secured by the Boundary Commission. General faunal considerations are deferred to the final report. The ground here covered is a belt of country along the parallel of 49° N., from the Red River of the North to the Rocky Mountains, representing the northern border of the Territories of Dakota and Montana. Of North American *Muridæ*, the genera *Sigmodon*, *Ochetodon*, *Myodes*, and *Cuniculus* are not represented, the first two being Southern, the others Arctic. All the genera and species are, however, introduced to complete an account of the group.

A. Subfamily MURINÆ.

(*Murine Series.*)

I. Genus **MUS**, L.

1. **Mus decumanus**, L.

Introduced.

2. **Mus musculus**, L.

Introduced.

(*Sigmodont Series.*)

II. Genus **NEOTOMA**, Say and Ord.

3. **Neotoma cinerea**, S. & O.

Eastern base and outliers of the Rocky Mountains; not eastward on the prairie. Frequent.

III. Genus **HESPEROMYS**, Woodh.

(Subgenus VESPERIMUS, Coues.)

4. **Hesperomys (Vesperimus) cucopus**, Lec.

Everywhere; the most abundant and characteristic species. Mainly represented by *var. sonoriensis.*

(Subgenus ONYCHOMYS, Baird.)

5. **Hesperomys (Onychomys) leucogaster,** Maxim.

Rare. One specimen secured at Pembina.

B. Subfamily ARVICOLINÆ.

IV. Genus **EVOTOMYS,** Coues.

6. **Evotomys rutilus,** var. **gapperi,** Coues.

Observed at various points. This is near its southern limit of distribution in these longitudes.

V. Genus **ARVICOLA,** Lacépède.

(Subgenus MYONOMES, Rafinesque.)

7. **Arvicola (Myonomes) riparius,** Ord.

Abundant, particularly about the prairie pools.

(Subgenus PEDOMYS, Baird.)

8. **Arvicola (Pedomys) austerus,** Lec.

Eastern portions of the Line. Probably represented westwardly by *var. curtatus*,* Cope.

VI. Genus **SYNAPTOMYS,** Baird.

9. **Synaptomys cooperi,** Bd.

Although not observed, the ascertained ranges of this remarkable and little known species brings it into the present connection. (Illinois, Kansas, Oregon, Alaska.)

VII. Genus **FIBER,** Cuvier.

10. **Fiber zibethicus,** Cuv.

On all the water-courses and permanent pools.

* The *Arvicola pauperrima*, Cooper, Am. Nat. ii., Dec. 1868, p. 535 (Washington Territory), not given in the following pages, is a synonym of *A. austerus*, var. *curtatus*, as I ascertain by examination of the type-specimen.

SYNOPSIS[1] OF THE MURIDÆ OF NORTH AMERICA.

Family MURIDÆ.

Taken in its current acceptation, but with exclusion of the genus *Jaculus*, which differs sufficiently in dentition, in the character of the anteorbital foramen, proportions of limbs, and other features.

$$\text{I.}\frac{1—1}{1—1};\ \text{C.}\frac{0—0}{0—0};\ \text{P.}\frac{0—0}{0—0};\ \text{M.}\frac{3—3}{3—3}=\frac{4—4}{4—4}=\frac{8}{8}=16\text{ teeth.}$$

Anteorbital foramen a large pyriform slit, bounded exteriorly by a broad plate of the maxillary.

Subfamily MURINÆ.

Molars rooted, tubercular, with crenate periphery. Root of under incisor causing protuberance on outside of jaw, at or near notch between condyle and coronoid process. Descending process of mandible a broad flattened plate, wholly below plane of the molars. Anterior root of zygoma deeply nicked at the anteorbital foramen. Palate nearly plane.

Murine Series.

Molars with three tubercles in transverse series. Soles naked. (Only indigenous in the Old World—introduced in the New.)

Genus I. **MUS**, Linn., emend.

1. **Mus decumanus.**
2. **Mus alexandrinus.**
3. **Mus rattus.**
4. **Mus musculus.**

[1] Abstract of a memoir in which the characters of the varieties, species, and higher groups are treated in full, with synonymy, bibliography, etc., and the argument for the views advanced. Based on the material (several thousand specimens) in the Museum of the Smithsonian Institution.

Sigmodont Series.

Molars with two tubercles in transverse series. Soles normally[1] hairy. (New World rats and mice.)

Genus II. **NEOTOMA**, Say and Ord.

Syn. *Mus*, sp , Say and Ord, 1818 ; Desm., 1822.—*Arvicola*, sp., Harlan, 1825.—*Lemmus*, sp., Fisch., 1829.—*Neotoma*, Say and Ord, J. A. N. S. P. iv. 1825, 346, and of authors ; type, *N. floridana*.—*Myoxus*, sp., Rich., Zool. Journ. iii. 1828, 517 (*N. cinerea*).—*Teonoma!* J. E. Gray (same type).

Obs. Embracing sigmodont rats of North and Middle America, of the largest size, highly murine in general aspect. None so small as the largest of the other N. American species. There are abundant cranial and external generic characters. Only here we find in one species a bushy distichous tail, almost as in *Sciurus*—a circumstance which doubtless caused the reference of the species to *Myoxus ;* but other species of the genus do not show this feature.

Analysis of Species.

I. Tail scantily hairy (nearly as in *Mus*).

a. Tail bicolor, barely or not as long as the body without the head. Feet entirely white. Length 9 inches or less ; tail 6 or less.

FLORIDANA.

b. Tail unicolor, blackish, about as long as head and body. Feet partly dusky.

a'. Large ; about the size and general coloration of *N. floridana*.

FUSCIPES.

b'. Small ; length about 7 inches. Coloration rich, warm rusty-red, with snowy white underparts. (Extralimital.)

FERRUGINEA.

II. Tail densely hairy (as in *Myoxus*), bicolor. Size of the first, or larger.

CINEREA.

Obs. In addition to the foregoing, occurs *N. magister*, a fossil species, known only by its skull. It is a probable progenitor of series I., if not of the whole. *N. cinerea* obviously stands apart; the other species still continue more nearly united, though I have not seen exactly intermediate specimens.

[1] Naked in *Sigmodon*, in subgenus *Oryzomys*, and almost so in two species of subgenus *Vesperimus*.

1. **Neotoma magister,** Baird, M. N. A. 1857, 498, in text. Loc. of remains:—Caves in Pennsylvania, near Harrisburg and Carlisle.

2. **Neotoma floridana,** Say and Ord.

Syn. *Mus floridana*, Ord, Bull. Soc. Philom. Phila. 1818, 181.
Arvicola floridana, Harlan, Fn. Amer. 1825, 141.
Neotoma floridana, Say and Ord, J. A. N. S. P. iv. 1825, 352, pl. x. figs. 1, 2, 3, 4.
Lemmus floridanus, Fischer, Syn. 1829, 299.
Neotoma mexicana, Bd., P. A. N. S. P. vii. 1855, 333; M. N. A. 1857, 490; Mex. B. Surv. ii. 1859, 44, pl. 24, f. 1 *a–g*.
Neotoma micropus, Bd., P. A. N. S. P. vii. 1855, 333; M. N. A. 1857, 492; Mex. B. Surv. ii. 1859, 44.

Hab. Southern United States, and Northern Mexico. North to Maryland (*Audubon*), New York (*Bell*), and Massachusetts (*Gibbs*). Illinois, Arkansas, Kansas.

3. **Neotoma fuscipes,** Cooper.

Syn. *Neotoma fuscipes*, Cooper's MSS., Bd., M. N. A. 1857, 495.

Hab. California.

[3 *bis.* Extralimital: **Neotoma ferruginea,** Tomes.]

Syn. *Neotoma ferruginea*, Tomes, P. Z. S. 1861, 281.

Hab. Guatemala. Tehuantepec (*Sumichrast*).

4. **Neotoma cinerea,** (Ord) Baird.

Syn. *Mus cinereus*, Ord, Guthrie's Geog., 2d Am. ed., ii. 1815, 292 (based on *ash-colored rat with hairy tail of the Rocky Mts.*, Lewis and Clarke, *passim*).
Neotoma cinerea, Bd., M. N. A. 1857, 499, pl. liii. f. 4.
Myoxus drummondii, Rich., Zool. Journ. iii. 1828, 517.
Neotoma drummondii, Rich., F. B. A. i. 1829, 137, pl. viii.
Neotoma occidentalis, Cooper's MSS., Bd., P. A. N. S. P. vii. 1855, 335; M. N. A. 1857, 496, pl. liii. f. 3.

Hab. Western and Northwestern North America, to the Pacific. East to Nebraska, Colorado, etc., and in British America to Hudson's Bay. South to New Mexico and California.

Genus III. **SIGMODON,** Say and Ord.

Syn. *Sigmodon*, Say and Ord, J. A. N. S. P. iv. 1825, 352. *Arvicola*, sp., Aud. and Bach., Harlan, Godman.—*Hesperomys* (subg. *Deilemys*), De Saussure, R. & M. Z. 1860 (type *toltecus*).

Obs. Very closely related to the average sigmodont mice. Larger than usual; pelage hispid; soles naked, granular; hind

feet very long. 1st and 5th toes subequal and very short; forefeet not half as long as the hind. Tail nearly naked. Dental and cranial characters slight. I can find but one species.

1. **Sigmodon hispidus,** Say and Ord.

Syn. *Sigmodon hispidum*, Say and Ord, J. A. N. S. P. iv. 1825, 354, pl. x. f. 5, 6, 7, 8; and of authors.

Arvicola hispidus, Godm., Am. Nat. Hist. ii. 1826, 68.

Arvicola hortensis, Harlan, Fn. Amer. 1825, 138.

Arvicola ferrugineus, Harl., Am. Journ. Sc. x. 1826, 285 (rusty var.).

Arvicola texiana, Aud. and Bach., Q. N. A. iii. 1853, 229, pl. cxlvii. fig. 2 (not A. texiana, *Id.*, *ibid.* 319, which is *Hesperomys leucopus*).

Sigmodon berlandieri, Bd., P. A. N. S. P. vii. 1855, 333; M. N. A. 1857, 504; Mex. B. Surv. ii. 1859, 44, pl. vi. f. 2, 2a (Texas and Mexico).—Tomes, P. Z. S. 1861, 281 (Guatemala).

Hesperomys (*Deilemys*) *toltecus*, De Saussure, R. & M. Z. 1860. p. —, pl. ix. f. 3a (Vera Cruz).

Hab. Southern United States and Mexico, especially coastwise. South to Guatemala.

Obs. Occupying a considerable stretch of country that affords very different climatic conditions, this species changes insensibly from reddish-brown lined with black, beneath whitish, tail rarely equalling the body alone, and hind foot not over 1.30 or under 1.10 (typical *hispidus*), to a grayer brown, with purer white under parts, tail sometimes equalling body and head, hind foot sometimes 1.37 ("*berlandieri*"); and this to an animal like the first in colors and proportionate length of tail, but the hind foot not over 1.10, sometimes only 0.95 ("*toltecus*").

Genus IV. **HESPEROMYS,**[1] Waterh., emend.

Syn. *Mus*, sp., Aud.—*Arvicola*, sp., Harl., Am. Monthly Journ. 1832, 446 (*nuttalli*); Aud. & Bach., Q. N. A. (*sonoriensis* Le C., *texana*, Woodh., and *oryzivora*, Aud. and Bach.).—*Hypudæus*, sp., Maxim.,

[1] In proposing *Hesperomys*, Waterhouse obviously intended only to separate the New World mice collectively from those of the Old World, on the difference in the dentition. This is evident throughout his article in the Voyage of the Beagle. Though treating only of South American species, he is at pains to say in one place that "*Mus leucopus*, *Neotoma* and *Sigmodon* certainly belong to the same group." As instituted, *Hesperomys* is precisely coequal with the tribe or series *Sigmodontes* as contrasted with typical Old World *Mures*. It includes in South America, *Calomys* (*Eligmodontia*, F. Cuv.), *Habrothrix*, *Phyllotis*, *Scapteromys*, *Oxymicterus*, *Holocheilus*, and *Reithrodon;* in North America, the "*Hesperomys*" of our authors, *Onychomys*, *Oryzomys*, "*Reithrodon*" of our authors, *Sigmodon*

Reise, ii. 1841, 99 (*leucogaster*).—*Musculus*, Raf., Am. Monthly Mag. iii. 1818, 446 (*leucopus*).—*Hesperomys*, Waterh., Zool. Voy. Beag. 1839, 75 (established for the New World mice collectively, and therefore equivalent to the tribe *Sigmodontes* as now understood).—*Calomys*, Aud. and Bach., Q. N. A. ii. 1851, 303 (*aureolus*).—*Onychomys*, Bd., M. N. A. 1857, 458 (*leucogaster*, Maxim.).—*Oryzomys*, Bd. *op. et loc. cit.* (*palustris* Harl.).

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and *Neotoma*. Naturalists soon perceived the supergeneric value of this assemblage, and sought to eliminate various groups under other generic appellations. Waterhouse himself established a number of divisions which, with some modifications, have been generally accepted. In North America, *Sigmodon* and *Neotoma*, with the so-called "*Reithrodon*," stand well apart from *Hesperomys;* in South America, *Holocheilus* and the true *Reithrodon* seem perfectly distinct. The rest of the American mice (at least so far as I know them) most probably fall under a restricted genus *Hesperomys;* we have only to tie this name down to the strict value of a genus, pin it to its type, and establish among the numerous species what subgeneric divisions we can. From the circumstances of its founding it is difficult to say what should be considered the type of *Hesperomys*. Waterhouse, in drawing his comparisons between *Mus* and the New World mice, took *M. rattus* and *M. bimaculatus* for such purpose; we may properly therefore elect the latter as technically the type. But when Waterhouse, in 1837, established *Calomys* upon *C. elegans*, he included in it both *bimaculatus* and *gracilipes;* and *Eligmodontia* of F. Cuvier is strictly coequal. It becomes a question whether one of these names should not stand in place of *Hesperomys* as restricted; but as the latter is firmly established, as *Calomys* is by the same author, and as *Eligmodontia* is no earlier, there may be no necessity for a change. Resting then upon this strict application of *Hesperomys* to such species as *bimaculatus*, *elegans*, and *gracilipes*, we may inquire how nearly, if at all, the North American Vesper-mice agree with it. In his essay of 1857, Prof. Baird elaborately details the characters of the South American species, and, excluding *Reithrodon* and *Holocheilus* as full genera, makes *Hesperomys* to include three subgenera, viz., *Calomys* Waterh., *Habrothrix* (=*Habrothrix plus Phyllotis*, Waterh.) and *Oxymicterus* (=*Oxymicterus plus Scapteromys*, Waterh.). Among North American forms, he establishes three subgenera, *Hesperomys*, *Onychomys*, and *Oryzomys*. I confirm these last unequivocally; the only point being whether the *leucopus* group, which Baird left in *Hesperomys*, is not also a group subgenerically different from that including *elegans*, *bimaculatus*, etc. All the North American mice seem to be differentiated from those of South America by characters of more than specific importance; the closest approach that I am aware of being found in the *leucopus* group, a species of which—*nuttalli*, yellowish underneath—comes near *Calomys*.

I propose to retain *Hesperomys* for all the North as well as certain South American species, and to divide the former into three subgenera; *Vesperimus*, Mihi, *Onychomys*, Baird, and *Oryzomys*, Baird.

Subgenus VESPERIMUS, Coues.

SYN. *Musculus*, Raf., Am. Month. Mag. iii. 1818, 446 (used in connection with *leucopus*, but ineligible for obvious reasons.)—*Hesperomys*, Baird (with exclusion of *Onychomys* and *Oryzomys*).—*Calomys*, Aud. and Bach. Q. N. A. ii. 1851, 303 (type *aureolus*; not of Waterhouse).

Char. Teeth strictly sigmodont. Back upper border of orbit not beaded (compare *Onychomys* and *Oryzomys*). Coronoid not attaining level of condyle. Cranial and dental characters in general strictly those of *Hesperomys*. Small but well-developed cheek-pouches! Of medium and small size, lithe form and quick movement. Eyes large, prominent. Snout pointed. Ears large, rounded, thin, scantily and finely pilous; antitragus evident but not valvular. Fore feet hardly or not half as long as the hinder; palms naked; fore claws not larger than the hinder; digits slender, 3d and 4th subequal and longest, 2d and 5th successively much shorter. Hind feet long, slender; soles 6-tuberculate, naked or scant-furred on the posterior third; 2d, 3d, and 4th subequal and much the longest, 5th shorter; 1st shortest. Tail terete, slender, closely hairy, ranging in length from as long as body alone to a little longer than head and body. Pelage soft, close, glossy, with but few longer bristly hairs; feet and under parts white or whitish; body and tail more or less distinctly bicolor. No woolly tufts of hair about the ears. Type, *V. leucopus*. (Compare diagnoses of *Onychomys* and *Oryzomys*.)

Obs. Among the multitude of species of this group ascribed to North America, I can recognize as distinct but the few following, having proven to my entire satisfaction the complete intergradation of the others.

1. **Hesperomys (Vesperimus) leucopus,** (Raf.) Le Conte.

SYN. *American Field Mouse or Rat*, Penn., Syn. 1771, No. 303; Hist. Quad. 1781, No. 302; Arct. Zool. i. 1784, 131.

American Wandering Mouse, Barton, Med. and Surg. Journ. Phila. i 1805, p. 31.

Mus sylvaticus, var., Erxl., Syst. Av. i. 1775, 390 (based on "New York var." of Pennant).

Mus sylvaticus, var. *noveboracensis*, Fisch., Syn. 1829, 318 (the same).

Mus noveboracensis, Selys-Longch., Études Microm. 1839, 67.

Mus agrarius, var. *americanus*, Kerr's Linn. 1792, 231 (based on Pennant).

Mus agrarius, Godman, Am. Nat. Hist. i. 3d ed. 1860, 316 (also in the earlier editions).

Cricetus myoides, Gapper, Zool. Journ. v. 1830, 204, pl. 10 (Canada).

Hesperomys myoides, Baird, M. N. A. 1857, 472 (Vermont, based on Gapper[1]).

Arvicola emmonsii, DeKay, Rep. Quad. Mass. 1840, 61.

Musculus leucopus, Raf., Amer. Month. Mag. iii. 1818, 446.

Mus leucopus, Desm., Mamm. ii. 1822, 307 ; and of authors.

Hesperomys leucopus, Le C., P. A. N. S. P. vi. 1852, 413, and of authors.

Hesperomys maniculatus, Wagn., Wieg. Arch. ii. 1843, 141, and ii. 1845, 148 ; Abh. Akad. Wissen., v. 1848, 316 (Labrador).

Hesperomys polionotus, Wagn., Wieg. Arch. ii. 1843, 52 (Georgia).

Hesperomys campestris, Le C., P. A. N. S. P. vi. 1853, 413 (New Jersey).

Hespermys texanus, Woodh., P. A. N. S. P. vi. 1853, 242 (Texas).

Hesperomys cognatus, Le C., P. A. N. S. P. vii. 1855, 442 (Southern States).

Hesperomys gracilis, Le C., P. A. N. S. P. vii. 1855, 442 (Northwest States).

Hesperomys austerus, Bd., P. A. N. S. P. vii. 1855, 336 (Washington Territory).

Hesperomys boylii, Bd., P. A. N. S. P. vii. 1855, 335 (California).

Hesperomys gambeli, Bd., M. N. A. 1857, 464 (Pacific Coast, U. S.).

?Hesperomys indianus, Maxim., Arch. f. Naturg. xviii. 1862, 111 (*fide Allen*).

[*Note.*—The above synonymy is exclusive of the several geographical varieties of this species which may be recognized.]

Hab. North America generally.

1*a*. **Hesperomys (Vesperimus) leucopus gossypinus** (Le C.).

Syn. *Hesperomys gossypinus*, Le Conte, P. A. N. S. P. vi. 1853, 411 (Georgia).

Hypudæus gossypinus, Le C., McMurtrie's Cuvier, i. 434, App.

Hab. South Atlantic States.

1*b*. **Hesperomys (Vesperimus) leucopus sonoriensis** (Le C.).

Syn. *? Mus leucopus*, Rich., Zool. Journ. iii. 1818, and F. B. A. i. 1829, 142.

Hesperomys sonoriensis, Le C., P. A. N. S. P. vi. 1853, 413 (Sonora).

Hesperomys sonoriensis, var. *nebrascensis*, Bd. M. N. A. 462, in text.

Hab. Interior of North America, west of the Mississippi, from Arctic Regions to Mexico (usually occupying this range to the

[1] The presence of cheek pouches, supposed to remarkably distinguish this animal, I have determined in *all* the species of *Vesperimus* examined. It is an interesting question whether they also occur in South American forms.

exclusion of typical *leucopus*, but associated with it in some localities).

1*c*. **Hesperomys (Vesperimus) leucopus eremicus** (Bd.).

Syn. *Hesperomys eremicus*, Bd. M. N. A. 1857, 479.—Coues, Quad. of Arizona, Am. Nat. i. 398.

Hab. Valleys of the Colorado and Gila Rivers.

Obs. The soles in this variety, and in species No. 4, are quite naked, but merely as an incident of their desert habitat.

2. **Hesperomys (Vesperimus) aureolus,** (Aud. & Bach.) Wagn.

Syn. *Mus* (*Calomys*) *aureolus*, Aud. & Bach., J. A. N. S. P. vi. 1842, 302; Q. N. A. ii. 1851, 303, pl. 95.

Hesperomys aureolus, Wagn., Wieg. Arch. ii. 1843, 51.

? Arvicola nuttalli, Harlan, Am. Month. Journ. 1832, 446; Med. and Phys. Res. 1835, 55, pl. 00.

Hesperomys nuttalli, Baird, M. N. A. 1857, 467.

Hab. Central and Southern States.

3. **Hesperomys (Vesperimus) michiganensis,** (Aud. & Bach.) Wagn.

Syn. *Mus michiganensis*, Aud. & Bach. J. A. N. S. Phila. viii. 1842, 304; Quad. N. A. iii. 1854, 326.

Hesperomys michiganensis, Wagn., Wieg. Arch. ii. 1843, 51.

Mus bairdii, Hoy & Kenn., U. S. Patent Office Rep. Agric. for 1856, (1857) 92, pl. xi.

Hab. Upper Mississippi Valley, especially Illinois, Michigan, and Wisconsin.

4. **Hesperomys (Vesperimus) californicus,** (Gambel) Baird.

Syn. *Mus californicus*, Gamb., P. A. N. S. P. iv. 1848, 78 (Monterey).

Hesperomys californicus, Baird, M. N. A. 1857, 478.

Hesperomys parasiticus, Cooper's MSS., Bd., op. cit. 479 (in text).

Hab. Southern and Lower California.

5. **Hesperomys (Vesperimus[1]) aztecus,** De Sauss.

Syn. *Hesperomys aztecus*, De Sauss., R. M. Z. 1860, p. 00 (p. 22 of the reprint).

Hab. "Mexico." Cape St. Lucas.

Obs. This species appears to belong strictly to the *Vesperimus* group. It is about the size and form of *V. leucopus*, but the tail is nearly naked and scarcely bicolor, while the colors are notably different; they differ just as those of *Neotoma ferruginea* do from

[1] I have not determined the presence of cheek pouches in this or the succeeding species; in all other respects they are truly *Vesperimus*, and they doubtless possess them.

those of *N. floridana*, in rich rusty-red on the sides and partly dusky metatarsus.

To the foregoing list I append the description of an apparently new species of this group:—

6. Hesperomys (Vesperimus) melanophrys, Coues, n. s.

Syn. ? ? *Hesperomys mexicanus*, De Sauss., R. M. Z. 1860, p. 00 (p. 20 of reprint), pl. ix. figs. 1, 1*a*.

Descr. from No. 10,183, Mus. Smiths., Sta. Efigenia, *Sumichrast*. General aspect of a species of the *leucopus* group. Large; nose to eye 0.62 (inches and hundredths), to ear 1.12, to occiput 1.40, to tail 4.15; tail 5.00; fore foot 0.42; hind foot 1.04; ear 0.78 above notch. Tail a little longer than head and body, slender, scant-haired. Absolute and relative proportions of feet and digits as in *V. leucopus*; soles hairy on posterior third. Ears large, leafy, apparently naked, really closely pilous. Whiskers reaching to or beyond the shoulder. Skull strictly as in *V. leucopus* (palate ending opposite last molars, not far behind it as in *Mus*, *Oryzomys*, etc.), but not quite so thin and papery, and developing a slight bead on the orbital border, as in the stouter mice generally. Color above giving the general impression of a *gray* mouse, rather than a red mouse with darker dorsal area as in *leucopus* and *aztecus*. It is gray, brightened with fulvous, slightly darker along the back, more decidedly fulvous laterally, and everywhere with a peculiar slight glaucous or hoary shade. Head noticeably purer gray; *eye encircled with a black ring in marked contrast*, the edges of the lids, and a little anteocular spot, being jet black. (This suggests the specific name; I have seen nothing like it elsewhere.) Color below, pure white, the plumbeous roots of the hairs, however, giving a slight grayish cast. Line of demarcation of this white with the color of the upper parts everywhere abrupt. Outside of fore leg colored to the very wrist, but back of the hand white. Hind leg also colored to and *a little beyond* the ankle, forming a definite dark spot on the base of the metatarsus, the remaining five-sixths of the foot being pure white. Tail above, like the back; below, gray—not white; and the line of demarcation, though evident, not sharp. No yellowish or fulvous tinge anywhere on the under parts ("*mexicanus*" of De Saussure is said to be yellowish on the chin and breast). Skull 1.20 long by 0.64 broad.

Obs. This may just possibly be *H. mexicanus* of De Saussure, but I cannot so identify it, and prefer to err on the safe side, if at all. Besides the above specimen, I have others from Tehuacan and Tehuantepec. It is nothing like any of the foregoing North American species. A female shows three pair of mammæ—one axillary, two inguinal.

Subgenus Onychomys, Baird.

Syn. *Hypudæus*, sp., Maxim., Reise, ii. 1841, 99, *nec auct.* *Mus*, sp., Aud. & Bach., Q. N. A. ii. 1851, 327 (*missouriensis*), *Hesperomys* subg. *Onychomys*, Baird, M. N. A. 1857, 458 (type *Hypudæus leucogaster*, Maxim.).

Diag. Skull strictly as in *Hesperomys* (*Vesperimus*), but molars larger with sharper saliencies and re-entrances. Coronoid attaining level of condyle. External form somewhat approaching the arvicoline in stoutness, and in shortness of tail and ears. Tail in type of the genus not one-half the length of the body alone—little if any longer than the head, very thick and tapering to an obtuse point. Ears about as in the arvicoline genus *Evotomys* (*Hypudæus* of Baird). Fore feet very large, $\frac{2}{3}$ to $\frac{1}{2}$ as long as the hinder, with long, little curved, almost fossorial claws, longer than those of the hind feet. Soles quadrituberculate only —densely furry to the tubercles. White beneath, as in typical *Vesperimus*. A strongly differentiated form! To the type of this section (*Hypudæus leucogaster* of Maximilian, afterward *Mus missouriensis* of Audubon) I add a peculiar variety—more probably a second species. The two may be thus distinguished:—

a. Tail much less than half the head and body, scarcely twice the hind foot. Fore foot more than half the hind foot. Ear about 0.50 high. Beneath snow-white; above mouse-brown with darker dorsal area.
LEUCOGASTER.

b. Tail nearly half the head and body, about $2\frac{1}{2}$ times the hind foot. Fore foot only half the hind foot. Ear about 0.75 high; beneath tawny white; above brownish fulvous without darker dorsal area.
(var?) TORRIDUS.

7. **Hesperomys (Onychomys) leucogaster,** (Maxim.) Baird.

Syn. *Hypudæus leucogaster*, Maxim., Reise, ii. 1841, 99 (Fort Clark).
Hesperomys (*Onychomys*) *leucogaster*, Bd., M. N. A. 1857, 480. (Nebraska.)
Mus missouriensis, Aud. & Bach., Q. N. A. ii. 1851, 327, pl. 100. (Fort Union, Montana.)

Hab. Interior of United States, between Mississippi and Rocky Mountains. Upper Missouri. Red River of the North (*Coues*). Wyoming. Kansas. Doubtless of more extended, but as yet unascertained range.

8. **Hesperomys (Onychomys) torridus**, Coues.

Diag. Resembling *O. leucogaster;* tail longer, ears larger, soles less hairy, fore claws weaker. Coloration much more yellowish; no darker dorsal area; snout, feet, and all under parts tawny-white; dusky stripe on top of tail very narrow, not reaching the tip. Length of head and body 3.75; of tail 2.00; of fore foot 0.40; hind foot 0.80; ear about 0.75 above notch. Only two pair (inguinal) of teats discovered. (Type No. 9886, Mus. S. I.)

Hab. Arizona.

Subgenus Oryzomys, Baird.

Syn. *Mus*, sp., Harl., Am. Journ. Sci. 1837.—*Hesperomys*, sp., Wagn. Suppl. Schreber, 1843, and authors.—*Arvicola*, Aud. & Bach., Q. N. A. iii. 1853.—*Oryzomys* (subg.), Bd., M. N. A. 1857, 458 (type *Mus palustris*, Harl.).

Char. Orbits beaded. Anteorbital foramen nearly circular above (somewhat as in *Jaculus*) continued slit-wise below, where narrower than in *Vesperimus;* the maxillary plate bounding it not produced into a pointed process (compare *Sigmodon.*) Palate produced behind last molars—a deep pit on either hand. Coronoid attaining level of condyle. Hind legs short, but feet very large, with obliquely set toes (much as in *Fiber*) in evident adaptation to aquatic habits. Soles perfectly naked, granular, with one long, narrow, postero-internal tubercle (as in *Mus* and five small ones. Toes with evident basal webbing; very unequal in length, the fifth reaching to the penultimate joint of the fourth (compare *Sigmodon*). Fore feet not half as long as the hinder; palms perfectly naked. Ears small, little overtopping the fur, hairy both sides, with a fluffy tuft in the concavity. Nasal pads more evident than in other sections. Tail long, about equalling the head and body, scant haired; the dermal scales and vertebral rings evident. Fur glossy, but coarse and hispid. Larger than any other N. American species of *Hesperomys;* general aspect of *Sigmodon* or even *Mus* proper.

9. **Hesperomys (Oryzomys) palustris,** (Harlan) Baird.

Syn. *Mus palustris* Harl., Am. Journ. Sci., xxxi. 1837, 386 (New Jersey).
Hesperomys palustris, Wagn., Suppl. Schreber, iii. 1843, 543.
Hesperomys (*Oryzomys*) *palustris*, Bd., M. N. A. 1857, 482.
Arvicola oryzivora, Aud. & Bach., Q. N. A. iii. 1853, 214, pl. 144, f. 3.

Hab. South Atlantic and Gulf States, north to New Jersey. Kansas! (*Goss*). Tehuantepec (*Sumichrast*). Jamaica?

Genus IV. **OCHETODON,** Coues, n. g.

Syn. *Mus, sp.*, Aud. & Bach.—*Hesperomys*, sp., Wagner.—*Reithrodon*, Le Conte, P. A. N. S. P. 1853, 413, and Baird, M. N. A. 1857, 447, *but not of Waterhouse.*

Diag. Form murine (general appearance of *Mus musculus*). Size minute. Skull as in *Vesperimus;* coronoid not attaining level of condyle. Tail about as long as head and body. Upper incisors grooved (unique character among N. American *Murinæ*). Front upper molars with four roots instead of three, as in *Hesperomys.*

Obs. The occurrence in North America of sigmodont mice with sulcate incisors was first noticed in 1841 by Audubon and Bachman, who described *Mus humilis.* Their animal was soon referred to *Hesperomys* by Wagner. But the peculiarity of the upper incisors was overlooked until 1853, when Maj. Le Conte took up the point and referred a species to the South American genus *Reithrodon*—a course followed by Prof. Baird in 1857, when the latter described three supposed new species, *R. montanus*, *megalotis*, and *longicauda.* But sulcation of the incisors is almost the only character that *Ochetodon* shares with *Reithrodon;* the two genera are otherwise widely different.[1]

[1] *Reithrodon*, Waterh., P. Z. S. 1837, 29; Zool. Voy. Beag. 1839. Type *R. cuniculoides.*

Diag. Upper incisors sulcate. Rostral portion of the skull large in proportion to the cranial, producing a high, convex forehead; zygomatic width of skull about $\frac{2}{3}$ its length; interorbital portion narrow; posterior nares contracted from close approximation of the pterygoids; palate with lateral paired fossæ, and ending nearly opposite or beyond the last molar; incisive foramina very long, extending to or beyond the first molar; coronoid process small and exflected; condylar narrow and very oblique; descending process large, subquadrate, the emargination between this and the condyle deep. Size large; form stout and compact; head broad and arched; eyes large and prominent; ears moderate, pilous; soles hairy behind; lateral toes subequal and extremely short; tail short, about one-half the head and body, moderately hairy.

Analysis of Species of Ochetodon.

A. Tail shorter than head and body (at most barely as long).
Hind feet under 0.70 long (usually 0.55 to 0.65). HUMILIS.

B. Tail longer than head and body.
Hind feet under 0.70 (exceptionally = 0.70). LONGICAUDA.
Hind feet over 0.70 (rarely, if ever = 0.70). MEXICANA.

1. Ochetodon humilis, (Aud. and Bach.) Coues.

Syn. *Mus humilis*, Aud. and Bach., P A. N. S. P. i. 1841, 97; J. A. N. S. P., viii. 1842, 300; Q. N. A., ii. 1851, 103, pl. lxv. (South Atlantic States.)
Hesperomys humilis, Wagner, Wieg. Arch. 1843, 51.
Reithrodon humilis, Bd., M. N. A., 1857, 448.
Mus lecontii, Aud. and Bach., J. A. N. S. P. viii. 1842, 307; Q. N. A. iii. 1854, 324 (no fig.). (South Carolina.)
Hesperomys lecontii, Wagn., Wieg. Arch. 1843, 51.
Reithrodon lecontii, Le C., P. A. N. S. P. vi. 1853, 413.

Most of which is widely different from what obtains in *Ochetodon*, the grooving of the incisors being merely a coincidence. Nor am I satisfied that the three supposed species of *Reithrodon* are strictly congeneric. They differ among themselves in cranial as well as external characters, to an extent at least warranting subgeneric separation. In respects of palatal structure and form of the anterior zygomatic root, there is a curious parallelism with the same points in *Sigmodon* and *Oryzomys*. I will tabulate some of the characters, as follows:—

Reithrodon proper. (Type *R. cuniculoides.*) Anterior root of zygoma deeply emarginated in front. Palate ending much behind the molar series, and showing a median ridge between lateral paired excavations. Pterygoid fossæ deeply excavated, and these bones closely approximated. Incisive foramina reaching beyond the first molars. Condylar process of mandible concave internally; descending process rounded off inferiorly; coronoid process very oblique. Species *R. cuniculoides*, Waterh., P. Z. S. 1837, 30, and Zool. Voy. Beag. 1839, pt. ii. p. 69, pl. xxvi. (animal), pl. xxxiii. figs. 2b, 2c, 2d, 2e (teeth), pl. xxxiv. figs. 2a, 2b, 2c (skull), from Patagonia; and a second supposed species *R. typicus*, Id., P. Z. S. 1837, 30; Voy. Beag. 1839, pt. ii. p. 71, pl. xxxiii. fig. 4a (teeth), from La Plata.

Euneomys, Coues, n. subg. (Type *Reithrodon chinchilloides.*) Anterior root of zygoma nearly straight in front. Palate ending nearly opposite the last molars, but slightly ridged or excavated. Pterygoid fossæ shallow; these bones less approximated. Incisive foramen only reaching to first molars. Condylar process of mandible flat internally; descending process angular; coronoid process nearly vertical. Species *R.* (*E.*) *chinchilloides*, Waterh., Zool. Voy. Beag. 1839, pt. ii. p. 72, pl. xxvii. (animal), pl. xxxiv. figs. 20a, 20b, 20c, 20d, 20e, 20f (skull and teeth), from Straits of Magellan.

? Mus carolinensis, Aud. and Bach., J. A. N. S. P. viii. 1842, 306; Q. N. A. iii. 1854, 332. (South Carolina.)

? Hesperomys carolinensis, Wagn., Wieg. Arch. ii. 1853, 51.

? Reithrodon carolinensis, Bd., M. N. A. 1857, 452.

Reithrodon megalotis, Bd., M. N. A. 1857, 451; Rep. Mex. B. Surv., ii. pt. ii. 1859, p. 43, pl. vii. fig. 4 a–c, pl. xxiv. fig. 4 a–g. (Sonora.)

Hab. United States, southerly. South Carolina to Texas. Kansas. Missouri. Iowa. Nebraska. Utah. Sonora.

2. **Ochetodon longicauda,** (Baird) Coues.

Syn. *Reithrodon longicauda*, Baird, M. N. A. 1857, 451.—? Tomes, P. Z. S. 1861, 284. (Guatemala.)

Hab. California (? south thence to Guatemala).

3. **Ochetodon mexicanus,** (De Sauss.) Coues.

Syn. *Reithrodon mexicanus*, De Sauss., R. and M. Z. 1860, p. — (p. 27 of reprint).—Tomes, P. Z. S. 1861, 284. (Guatemala.)

Hab. Mexico. Guatemala. Louisiana ?

4? **Ochetodon montanus,** (Bd.) Coues (sp. proband.)

Syn. *Reithrodon montanus*, Bd., P. A. N. S. P. vii. 1855, 335; M. N. A. 1857, 449, pl. liv. fig. No. 1306 (teeth). (Rocky Mts., lat. 39°.)

5 ? **Ochetodon sumichrasti,** (De Saus.) Coues. (sp. proband.)

Syn. *Reithrodon sumichrasti*, De Saus., R. M. Z. 1861, 3. (Mexico.) (Unknown to me.)

Subfamily Arvicolinæ.

Molars normally rootless, prismatic, with serrate periphery and flat crowns. Root of under incisor causing protuberance on inside of jaw at or near notch between condyle and descending process. Descending process of mandible hamular, attaining level of molars. Coronoid a long stout hook. Anterior root of zygoma not obviously nicked. Palate highly arched.

Genus V. EVOTOMYS, Coues, n. g.

Syn. *Arvicola*, sp., Auct.—*Myodes*, Selys-Lougch., Études de Microm. 1839, 87 (not of Pallas).—*Hypudæus*, Keys. and Blas., Wirbelth. 1842 (type *A. glareola;* not of Illiger, which includes *Mus lemmus*, *amphibius*, etc.).—*Hypudæus* of Baird, M. N. A., 1857, 513, 515, 518 (type *A. gapperi*).—*Evotomys*, Coues (type *Mus rutilus*, Pall.).

Diag. Dentition arvicoline, in flat-topped prismatic molars, but murine in *rooting* of the molars (molars only rooted here among *Arvicolinæ*). Coronoid process of lower jaw not attaining level

of the condyle (unique among *Arvicolinæ*). Bony palate ending in a straight flat shelf opposite middle molars, the whole space between last molars thus left open. General form arvicoline, but ears distinctly overtopping the fur as in *Murinæ*. A strong genus, linking the two subfamilies. There are many peculiarities besides these given.

1. **Evotomys rutilus,** (Pall.) Coues.

Syn. *Mus rutilus*, Pall., N. Sp. Quad. Glir. 1778, 246, pl. xiv. B.
Arvicola gapperi, Dall, Alaska and its Resources, 1870, 577.

Hab. Arctic, circumpolar. Southward in this country this species shades into the following variety:—

1*a*. **Evotomys rutilus, var. gapperi,** (Vig.) Coues.

Syn. *Arvicola gapperi*, Vig. Zool. Journ. v. 1830, 204, pl. 9. (Canada.)
Arvicola (*Hypudæus*) *gapperi*, Baird, M. N. A. 1857, 518.
Arvicola fulva, Aud. and Bach., J. A. N. Phil. viii. 1842, 295. (Name preoccupied.)
Arvicola dekayi, Aud. and Bach., Q. N. A. iii. 1854, 287 (same as their *A. fulva* of 1842). Excl. syn. "*oneida* DeKay" which belongs to *A. riparius*.

Hab. Northern frontier of United States, from Atlantic to Pacific, and adjoining belt of British America. South to Massachusetts.

Obs. This species and its variety are distinguished at a glance by the prominent ears and chestnut coloration.

Genus VI. **ARVICOLA,** Lacép., emend.

Syn. *Mus*, sp., Linn., Syst. Nat. i. 1766, *et auct. antiq.*—*Mures cuniculari*, Pall., N. Sp. Glir. 1778, 77.—*Lemmus*, Linck, Fischer, *et al.*—*Myodes*, Pall., Zoog. R. A. i. 1811, 172 (not *Myodes* of Selys-L., 1839, which = *Hypudæus*, Keys. and Blas. = *Evotomys*, Coues).—*Arvicola*, Lacépède, Tabl. 1803, *et auct. recent.* (includes *amphibius* and *arvalis*).—*Hypudæus*, Ill., Prod. 1811 (not of Keys. and Blas., nor of Baird. Includes *lemmus*, *amphibius* and *arvalis*),—*Myonomes*, Rafinesque, ——— (type "Wilson's Meadow Mouse" = *Arvicola pennsylvanica* of Ord.).—*Psammomys*, Le C., Ann. Lyc. N. Y. 1829, 132 (type *pinetorum*; not of Rueppel).—*Pitymys*, McMurtrie, ed. Cuvier, i. 1831, 434 (type *A. pinetorum*).—*Hemiotomys*, Selys-L., Études, 1839, 85 (*amphibius*, *terrestris*, etc.).—*Microtus*, Selys-L., Études, 1839, 86.—*Pinemys*, Lesson, Nouv. Tabl. R. A. 1842, 12 (type *pinetorum*).—*Hemiotomys*, Bd., M. N. A. 1857, 515 (type *A. riparius*, Ord.).—*Pedomys*, Bd., op. cit. 517 (type *A. austerus*, Le C.).—*Chilotus*, Bd., op. cit. 516 (type *oregonus*, Bach.).

Obs. The limits I would set to *Arvicola* may be gathered from the foregoing, though doubtless some synonyms, and, perhaps, some tenable subgeneric names, of old world forms, have escaped me. Without, therefore, writing out the full diagnosis, I will simply mention characters which separate *Arvicola* as I accept it from the other North American *Arvicolinæ*:—

Molars normally rootless, perennial (*cf. Evotomys*). Folds of enamel fusing at the re-entrances (*cf. Evotomys*). Molars viewed from above about equally serrate on either side (*cf. Myodes*, *Synaptomys*). Upper molars all subequal in length and breadth (*cf. Myodes*, *Synaptomys*). Middle lower molar of 4–5 prisms, the last a transverse loop, the rest alternating lateral triangles (*cf. Evotomys*). Back lower molar of not more than 3 prisms seriatim (*cf. Synaptomys*, *Myodes*), each making a transverse loop. General molar pattern, as to number of prisms to a tooth, as shared by most Arvicolinæ (*cf. Cuniculus*). Upper incisors plane (*cf. Synaptomys*). Roots of under incisors running up the condylar process forming a ridge that only subsides near the notch between condyle and descending process (*cf. Synaptomys*, *Myodes*, *Cuniculus*). Palate not ending behind in a flat straight-edged shelf (*cf. Evotomys*, *Myodes*, *Cuniculus*). Coronoid process as high as condyle (*cf. Evotomys*). Ears moderately developed (*cf. Myodes*, *Cuniculus*), but not overtopping the fur (*cf. Evotomys*). Tail longer than foot (*cf. Myodes*, *Cuniculus*). Fore claws of normal size and growth (*cf. Cuniculus*). The species do not turn white in winter (*cf. Cuniculus*). Many other details could be adduced.

The North American species fall in four sections or subgenera, as established by Baird. I use *Myonomes*, Raf., for the section for which Baird employed *Hemiotomys*, Selys, as none of our sections seem exactly the same as any one of Europe. *Pedomys* and *Pitymys* are like each other in skull and dentition, but offer external peculiarities. The sections may be thus analyzed:—

A. Myonomes. Back upper molar with 2 external triangles and a posterior crescent. Middle upper molar with 2 internal triangles. Front lower molar with 3 internal and 2 or 3 external lateral triangles. Ears unrimmed in front. Soles 6-tuberculate. Fore claws not longer than the hinder ones. Tail about $\frac{1}{3}$ the length of head and body, or more. Pelage ordinary. Size maximum and medium.

B. Chilotus. Back upper molar with only 1 external triangle and a posterior trefoil. Middle upper molar with 1 internal triangle. Front lower molar with 3 internal and 2 or 3 external triangles (as in

Myonomes). Ear with a rim in front of meatus, the anterior and posterior roots of the auricle there meeting. Soles 5-tuberculate (?). Fore claws not larger than the hinder. Tail about $\frac{1}{3}$ the head and body. Pelage ordinary. Size minimum.

C. Pedomys. Back and middle upper molars as in the last. Front lower molar with only 2 internal and 1 external triangle. Ear unrimmed. Soles 5-tuberculate. Fore claws not larger than the hinder. Tail $\frac{1}{3}$ the head and body, or rather less. Pelage ordinary. Size medium.

D. Pitymys. Molars all as in *Pedomys*. Ears unrimmed. Soles 5-tuberculate. Fore claws larger than the hinder. Tail about $\frac{1}{4}$ the head and body, or less. Pelage dense, silky, mole-like. Size small.

Subgenus Myonomes, Raf.

Syn. *Arvicola* of most American writers.—*Arvicola*, A, *Hemiotomys*, Baird, M. N. A. 1857, 515 (type *riparius*. Not of Selys-L.). —*Myonomes*, Raf. ——— (type *M. pratensis*, Raf., based on "Wilson's Meadow Mouse" = *A. pennsylvanica*, Ord. = *A. riparius*, Ord.).

1. Arvicola (Myonomes) riparius, Ord.

Syn. *Campagnol or Meadow Mouse of Pennsylvania*, Warden, Descr. U. S., v. 625.

Meadow Mouse, Wils., Am. Orn., vi. pl. 50, f. 3.

Arvicola pennsylvanica, Ord, Guthrie's Geog. 2d Am. ed. ii. 1815, 292 (based on the foregoing).—Harlan, Fn. Amer. 1825, 144 (in part; quotes Ord, but describes *pinetorum*).

Arvicola riparius, Ord, J. A. N. S. P. iv. 1825, 305. (Philadelphia.)

Arvicola riparius longipilis, Kenn., Agric. Rep. U. S. Patent Office, 1856, 304. (West Northfield, Ill.; in winter pelage.)

Arvicola xanthognatha, Harlan, Fn. Amer. 1825, 136 (also of Godman, Say, DeKay, and Linsley, but *not* of Leach nor of Richardson).

Arvicola alborufescens, Emmons, Rep. Quad. Mass. 1840, 60 (albino).

Arvicola hirsutus, Emmons, *l. c.*

Arvicola nasuta, Bachm., J. A. N. S. Phila. viii. 1842, 296. (Massachusetts.)

Arvicola oneida, DeKay, N. Y. Fn. i. 1842, 88, pl. xxiv. f. 1. (New York.)

Arvicola rufescens, DeKay, op. cit. 85, pl. xxii. f. 1. (New York.)

Arvicola occidentalis, Peale, Mamm. U. S. Ex. Ex. 1848, 45. (Puget Sound.)

Arvicola californica, Peale, op. cit. 46. (California.)

Arvicola montana, Peale, op. cit. 44. (California.)

Arvicola edax, Le C., P. A. N. S. P. vi. 1853, 405. (California.)

Arvicola borealis, Le C., op. cit. 407. (Rhode Island.) (Not of Rich.)

Arvicola trowbridgei, Bd., M. N. A. 1857, 529 (in text). (California.)

Arvicola longirostris, Bd., op. cit. 530. (California.)

Arvicola modesta, Bd., op. cit. 535. (Rocky Mts.) (Very young.)
Arvicola rufidorsum, Bd., op. cit. 526. (Mass.) (Reddish specimen.)
Arvicola breweri, Bd., op. cit. 525 (Muskeget, Mass.; bleached insular race).

1*a*. **Arvicola (riparius var.?) borealis**, Rich. ?

Syn. *?Arvicola borealis*, Rich., Zool. Journ. 1828, 517; F. B. A. i. 1829, 127.—Also of Aud. and Bach., and of Baird.

Hab. Northwestern America.

Obs. This and the two succeeding species are presented provisionally.

2. **Arvicola (Myonomes) townsendii**, Bach.

Syn. *Arvicola townsendii*, Bach., J. A. N. S. P., viii. 1839, 63, and of subsequent writers.

Hab. Oregon and Washington Territories.

3. **Arvicola (Myonomes) xanthognathus**, Leach.

Syn. *Arvicola xanthognatha*, Leach, Zool. Misc. i. 1814, 60, pl. 26.—Rich., F. B. A. i. 1829, 122.—Aud. and Bach., Q. N. A. iii. 1853, 67, pl. 125.—Bd., M. N. A. 1857, 552.—Dall, Alaska and its Resources, 1870, 577.—Whether of Sabine? but certainly not of any author treating of United States species.

Hab. British America.

Obs. In its typical condition the animal is unmistakable in its immense size (up to 8 inches long) and chestnut cheeks. There remain, however, some points to be elaborated before the relationship of the several forms of *Myonomes* can be considered established.

Subgenus Chilotus, Baird.

Syn. *Chilotus*, Baird, 1857. Type, *A. oregoni*, Bach.

4. **Arvicola (Chilotus) oregonus**, Bach.

Syn. *Arvicola oregoni*, Bach., J. A. N. S. P., viii. 1839, 60.—Aud. and Bach., Q. N. A. iii. 1853, 232, pl. clxvii. f. 3.—Bd., M. N. A., 1857, 537.

Hab. Oregon.

Subgenus Pedomys, Baird.

Syn. *Pedomys*, Bd., M. N. A. 851, 517. Type, *A. austerus*, Le C.

5. **Arvicola (Pedomys) austerus**, Le C.

Syn. *Arvicola austerus*, Le C., P. A. N. S. P. vi. 1853, 405. (Wisconsin.)
Arvicola (*Pedomys*) *austerus*, Bd., M. N. A. 1857, 532, pl. liv. (Wisconsin and Missouri to Louisiana.)

Arvicola (*Pedomys*) *cinnamoma*, Bd. *op. cit.* 541, pl. liv. (Minnesota.)
Arvicola (*Pedomys*) *haydeni*, Bd., *op. cit.* 543. (Nebraska.)

Hab. Western States and adjoining Territories, especially Illinois, Missouri, and Michigan. Kansas. Louisiana.

5*a*. **Arvicola (Pedomys) austerus, var. curtatus,** Cope.

Syn. *Arvicola curtata*, Cope, Pr. A. N. S. Phila. 1868, 2. (Owen's Valley, California.)

Hab. United States, west of the Mississippi. California. Colorado. Kansas and Nebraska, where becoming mixed up with true *austerus*.

Obs. In comparing his supposed new species with "*A. modesta*," Prof. Cope was misinformed as to its affinities. It is a true *Pedomys*, not in the least like any style of *Myonomes*, as I ascertain by inspection of the type specimen. Its extreme modification is peculiar in the small size, and very short tail (less than the head): it shades directly into ordinary *austerus*.

Subgenus Pitymys, McMurtrie.

Syn. *Psammomys*, Le C., 1829, *nec Rüppel* (type *pinetorum*).—*Pitymys*, McMurt., 1831 (same type).—*Pinemys*, Less, 1831 (same type).

6. **Arvicola (Pitymys) pinetorum,** Le Conte.

Syn. *Arvicola pennsylvanica*, Harl., Fn. Amer. 1825, 144, in part; the descr. but not the synon. (*not of authors*).
Psammomys pinetorum, Le C., Ann. Lyc. N. Y. iii. 1829, 132, pl. ii.
Pitymys pinetorum, McM., Am. ed. Cuvier, i. 1831, 434.
Pinemys pinetorum, Less., Nouv. Tabl. R. A. 1842, 12.
Arvicola pinetorum, Aud. and Bach., Q. N. A. ii. 1851, 216, pl. lxxx. (excl. syn. "*oneida* DeKay.")
Arvicola (*Pitymys*) *pinetorum*, Bd., M. N. A. 1857, 544.
Arvicola scalopsoides, Aud. and Bach., J. A. N. S. Phila. viii. 1842, 299 (Long Island).
Arvicola apella, Le C., P. A. N. S. P. vi. 1853, 405. (Pennsylvania.)

6*a*.? **Arvicola (Pitymys) pinetorum, var. quasiater,** Coues, n. v.

Diag. Subgeneric characters of *Pitymys* (skull not seen), and somewhat resembling *P. pinetorum* (particularly the large dark style formally called *scalopsoides*). Rich glossy blackish, appearing quite black at first sight, but this color warmed into a slight auburn shade by uniform admixture of dusky chestnut or chocolate brown. No markings anywhere; color of the upper parts changing on the sides insensibly into blackish-ash or dark plumbeous of the under parts, which are slightly hoary. Tail like back

above, indistinctly paler below. Fur short, close, of so rich silky lustre that in some lights an appreciable purplish or coppery iridescence is seen. General build of *pinetorum;* rather stouter, larger; nose to eye 0.50; to ear 1.05; to tail 4.33–4.45; tail vertebræ 0.70; with hairs 0.80; height of ear in front 0.45; palm 0.33; sole 0.66.

Hab. Mexico. (Xalapa, *De Oca*, No. 3524, Mus. S. I., type of the species; Tuxpango, *Sumichrast*, No. 7006, Mus. S. I.)

Obs. This peculiar field mouse, which may prove entirely distinct from *pinetorum*, is specially interesting in coming from a region where the genus was long supposed to be not represented. I have never seen any other *Arvicola* from south of the United States, nor is there, to my knowledge, but a single one hitherto described from so low a latitude, on this hemisphere at least. This is *Arvicola* (*Hemiotomys*) *mexicanus*, De Sauss., R. M. Z. 1861, 3, a species apparently allied to *A. riparius*.

Genus VII. **SYNAPTOMYS**, Baird.

Syn. *Synaptomys*, Bd., M. N. A. 1857, 558, in text under *Myodes*, and p. xliv.

Diag. Superior incisors grooved (unique in the subfamily). Root of inferior incisor ending abruptly opposite last lower molar (the root generally runs up to the condyle in *Arvicolinæ*). Construction of molars, and general cranial characters as in *Myodes*. Palate ending as in typical *Arvicola*. External characters in general of an ordinary arvicoline style, but in the very long soft full pelage, short heavy head, and blunt muzzle, approaching the Lemmings; nevertheless, ears equalling or overtopping the fur as in *Evotomys*, and tail equally or exceeding the hind foot, as usual in *Arvicola*.

Obs. Foregoing are the essential characters of the most remarkable genus of the subfamily, one singularly combining peculiarities of several widely different arvicoline genera. It may be defined in a word as skull and teeth of *Myodes*, in body of *Arvicola*, with ears of *Evotomys*, and *sui generis* sulcation of upper incisors. The genus was happily characterized in 1857, but upon such miserably inadequate material,[1] that Prof. Baird did not formally

[1] No. $\frac{1367}{2330}$, Mus. S. I., merely a rat-eaten bunch of fur, lacking head, tail, and three of the feet, with a defective skull; and No. 1368, skin with feet and tail, but no head, and no skull. Locality unknown, supposed United States. Received from Wm. Cooper.

introduce either genus or species in the body of his work, though in the introductory list he gives *Synaptomys* as a subgenus of *Myodes* and catalogues a species, *S. cooperi*. Though defined with precision, as far as the material would allow, the genus remains little known. I can indorse it unequivocally, and add all details hitherto wanting. There is probably no more strongly marked genus of *Arvicolinæ*.

The groove of the upper incisor is deep, distinct, and runs near the outer edge instead of along the middle (as in *Ochetodon* and *Reithrodon*). The incisors are short, broad, and much curved; their front much bevelled off, so that, viewed in profile, one part of each incisor stands in front of and parallel with the part on the other side of the groove. These teeth tend to the *Myodes* pattern further in being enamel tubes not completely filled with dentine (calling to mind an unfinished quill pen, after the first oblique slice is cut away); their tips are not straightly transverse, and generally nicked at the end of the groove. The under incisors, exactly as in *Myodes*, stop as to their roots abruptly just in front and inside of the last lower molar; while in all other *Arvicolinæ* I have examined, excepting *Myodes* and *Cuniculus*, the root runs past (outside) the lower molar up the ramus of the jaw to near the condyle, this passage of the root making an obvious ridge, here wanting. In *Synaptomys*, as in the genera just mentioned, the whole condylar ramus is thus flat, with its inner surface nearly plane, separated by a strong sulcus from the end of the alveolar portion of the jaw.

As is well known, the molars of *Myodes* (restricted to exclude *Cuniculus*), though essentially aggregated rootless prisms as in other *Arvicolinæ*, are quite different in their details of pattern. Not to go here into detail, I may simply say, that the inner margin of the molar series is *crenate*, not sharply serrate like the outer as in *Arvicola*. Now this pattern of *Myodes* is duplicated in *Synaptomys*, and so is every other molar detail. Incisors aside, the skull and teeth of *Synaptomys* are not distinguishable with certainty from those of *Myodes*. Outside, *Synaptomys* is not a lemming, but an *Arvicola*, one, too, with ears as large as in *Evotomys*. An alcoholic specimen might be mistaken at first sight for *Arvicola austerus*. One might suppose it originally a lemming, stranded in time long past in latitude so low as to impress upon it ordinary arvicoline exterior characters.

Measurements of a skull of *Synaptomys cooperi* (No. 6915, Mus. S. I., Kansas, *B. F. Goss*). Total length (occip. protub. to end of nasals) 1.14; greatest zygomatic width, 0.72; least width (at interorbital constriction) 0.15; width of rostrum, 0.25; intermastoid width 0.58; interparoccipital width 0.37; height opposite and including last molar, without lower jaw, 0.45; length of upper molar series 0.30; length of extra-alveolar portion of upper incisors 0.24; length of rostrum 0.25; tip of under incisors to apex of coronoid 0.62, to back of condyle 0.79, to end of descending process 0.81; length of under molar series 0.28; of extra-alveolar portion of under incisor 0.25.

1. **Synaptomys cooperi**, Baird.

Myodes (*Synaptomys*) *cooperi*, Bd., M. N. A. 1857, p. xliv.
Synaptomys cooperi, *op. cit.* 558, in text.
Arvicola (*Synaptomys*) *gossii*, Bd., Mus. S. I. (labels of Kansas specimens which, however, are inseparable from the types).

Hab. Middle and Western United States and northward. Brookville, Indiana, *Haymond*. South Illinois, *Kennicott*. Benton Co., Minnesota, *Garrison*. Neosho Falls, Kansas, *Goss*. Skagit Valley, Oregon, *Kennerly*. Nulato, Alaska, *Dall*.

Dimensions (average of several, alcoholic, from Kansas). Nose to eye 0.45; to ear 0.95; to occiput 1.20; to root of tail 3.50 (from 3.00 to 4.00—range of the whole series 2.90 to 4.30); tail vertebræ 0.65 (from 0.51 to 0.75); tail, with hairs, 0.75; fore foot 0.40; hind foot 0.70; ear 0.35.

Eighteen specimens, dry and alcoholic, examined from the above localities.

Genus VIII. **MYODES**, Pall., emend.

Syn. *Mus*, sp., *et Arvicola*, sp., Auctt. antiq.—*Hypudæus*, Illiger, 1811, *partim* (includes *Mus lemmus*, *amphibius*, etc.).—*Myodes*, Pall., Zoog. R. A. i. 1811, 172, in part (includes *Arvicola*, and thus about coextensive with his *Mures cunicularii* of 1778).—*Lemmus*, Linck (fide Bd. In part; includes *Arvicola*.)—*Georychus*, Rich., F. B. A. 1829; and Aud. and Bach., 1854 (includes *Cuniculus*). Not of Illiger, which is of an entirely different family.

Obs. The chars. of this genus should unquestionably be so drawn as to exclude *Cuniculus*, which latter, although also a "lemming," is quite as widely separated as the other genera of *Arvicolinæ* are. Being based upon a long and well-known animal, the

characters need not be here recapitulated. The several ascribed species of North American *Myodes* proper are reducible to the following, which is not specifically separable from that of Asia.

1. **Myodes obensis**, Brantz.

Syn. *Myodes obensis*, Brantz, Muisen, 1827, 55.—Keys. and Blas., Werb. Eur. vi. 1840, pp. vii. and 32. Midd., Sib. Reise, ii. 1853, 99, pl. ii. figs. 7, 8, 9, pl. viii. pl. ix. and pl. x. f. 2.—Baird, M. N. A., 1857, 559.

Arvicola (*Georychus*) *helvolus*, Rich., F. B. A., 1829, 128.

Georychus helvolus, Aud. & Bach., Q. N. A. iii. 1853, 84, pl. cxx. f. 1.

Myodes helvolus, Dall, Alaska and its Res. 1870, 577.

Arvicola (*Georychus*) *trimucronatus*, Rich., App. Parry's 2d Voyage, 1825, 309; F. B. A. i. 1829, 130.

Georychus trimucronatus, Aud. and Bach., Q. N. A. iii. 1833, 86, pl. cxx. f. 2, 3.

Myodes trimucronatus, Dall, Alaska, 1870, 577.

Myodes albogularis, Wagner, Suppl. Schreber, iii. 1843, 602.

Hab. More western portions of Arctic America.

Obs. Of this species I have handled about forty specimens, the first examined by an American naturalist for many years. They differ somewhat from the only two Siberian skins before me, possibly representing a variety (to be called *Myodes helvolus*); but I am far from disputing Von Middendorff's decision as to their specific identity with the Asiatic animal.

Genus IX. **CUNICULUS**, Wagler.

Syn. *Mus*, *Arvicola*, *Myodes et Lemmus*, Auctt.—*Georychus*, *partim*, Rich., Aud. and Bach., *nec Ill.*—*Cuniculus*, Wagler ("1830"), Isis, 1832, 1220; type *C. grœnlandicus* = *C. torquatus* or *hudsonius*.—Lilljeborg, Syst. Ofvers. Gnag. Glires, 1866 (same type).

Obs. Without going into the characters of a perfectly well-known form, I wish to particularly signalize the fact that this genus, though based upon a "lemming," is very different from *Myodes*, and, indeed, from any other arvicoline type. The molar pattern is strongly of an ordinary arvicoline general character—not at all as in *Myodes* or *Synaptomys*—while details of the molar dentition (as, for instance, *six* prisms on back upper molar and *nine* on front lower molar) are unique. The obsolete ear and pollex, the singular hypertrophy of the two middle fore claws, and the notable seasonal changes of pelage, are all peculiar. I find but one American species, identical with that of Asia. A second supposed species, *C. lagurus*, I have not seen.

1. **Cuniculus hudsonius,** (Forst.) Coues.

Syn. *Mus hudsonius*, Forst., Phil. Trans. lxii. 1772, 379.—Pall., N. Sp. Glir. 1778, 201.—Gm., Syst. Nat. i. 1788, 137.
Lemmus hudsonius, Sab., Suppl. Parry's Voy. 1824, 185; App. Franklin's Journ. 1825, 661.—Harl., Fn. Amer. 546.
Arvicola hudsonia, Rich., App. Parry's 2d Voy., 308.
Arvicola (*Georychus*) *hudsonius*, Rich., F. B. A. i. 1829, 132.
Myodes hudsonius, Wagn., Suppl. Schreb. iii. 1843, 604.—Midd., Bull. Acad. St. Petersb. iii. xix. Dall, Alaska, 577.
Georychus hudsonius, Aud. and Bach., Q. N. A. iii. 1853, 81, pl. cxix.
Mus torquatus, Pall., N. Sp. Glir. 1778, pp. 77 and 205, pl. xi. B.
Myodes torquatus, Keys. and Blas. Wirb. Eur. 1840, pp. vi. and 32.—Midd., Sib. Reise, ii. 1853, 87, pl. iv.–vii. and x.—Baird, M. N. A., 1857, 558.
Mus lenensis, Pall., N. Sp. Glir. 1778, 195.
Mus grœnlandicus, Traill, Scoresby's Greenland, 1823, 416.
Arvicola (*Georychus*) *grœnlandicus*, Rich., F. B. A. i. 1829, 134.
Georychus grœnlandicus, Aud. and Bach., Q. N. A. iii. 1854, 315.
Cuniculus grœnlandicus, Wagler, Isis, 1832, 1220.
Myodes grœnlandicus, Wagner, Suppl. Schreber, 1843, 606.
Lemmus ungulatus, Baer, Baer and Helm., Beit. iv. 1841, 283.
Hudson's Rat and Hare-tailed Rat, Penn., Arct. Zool. i. 132, 133; Quad. ii. 201.—*Hare-tailed Mouse*, Hearne, Journ. 387.—*Hudson's Bay Lemming*, Aliq.—*Wapiskooseesick* ("White Bear Mouse") of the Crees, *Lunaguy* ("White Mouse") of the Chippeways, *Awingnack* ("White Mouse") of the Esquimaux.

Hab. Arctic regions.

Genus X. **FIBER,** Cuvier.

Syn. *Castor*, L., S. N. i. 1766, 78 (not type).—*Mus*, Gm., S. N. i. 1788 (not type).—"*Myocastor*, Kerr's Linn., 1792," partly, (type *Myopotamus coypus*).—*Fiber*, Cuv., Leçons, i. 1800 (type *Castor zibethicus*, L.).—*Lemmus*, Fisher, Syn. 1829 (partly).—*Ondatra*, Waterh., Charlesw. Mag. iii. 1839 (type *zibethicus*).

Obs. Although this well-known form presents many peculiarities, these are chiefly in adaptation to aquatic habits; it is strictly arvicoline in all essentials.

1. **Fiber zibethicus,** (L.) Cuv.

Syn. *Castor zibethicus*, Linn., S. N. i. 1766, 79.
Mus zibethicus, Gm., S. N. i. 1788, 125.
Myocastor zibethicus, "Kerr's Linn. 1792."
Fiber zibethicus, Cuv., R. A. i. 1817, 172, and of authors.
Lemmus zibethicus, Fisch., Syn. 1829, 289.
Ondatra zibethicus, Waterh., Charlesw. Mag. iii. 1839, 594.

? **Fiber osoyensis,** Lord, P. Z. S. 1863, 95 (British Columbia).

Hab. North America.

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